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"OPINION"

TIMBER IN INSULATION

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MODERN REFRIGERATION
and Air Control News

Incorporating
COLD STORAGE AND PRODUCE REVIEW
and ICE AND COLD STORAGE

Established 1898

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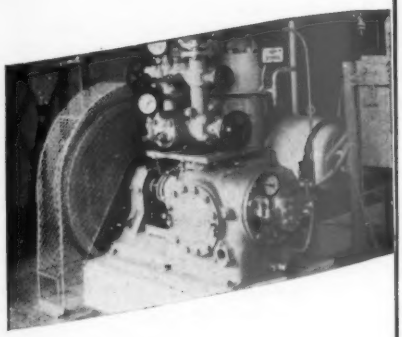

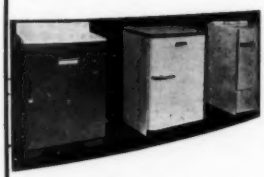

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"M.R.", now in its 61st year of publication, has built up for its overseas readers special subscription and sales agencies in all the above territories.

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August . 1958

Editorial . . . .

Fridge Sales Soar

U.S. Societies to Merge

Refrigeration in Medicine

● The boom in domestic refrigerators continues, with sales managers exuberant and production managers a trifle perplexed as the back-log grows. Even before the Chancellor cut the purchase tax in April, new records were being established. For instance, sales of gas-operated refrigerators rose from 12,000 to 22,000, an increase of 78 per cent., during the twelve months to the end of March, 1958, as compared with the previous year. The sales by the area electricity boards during the twelve months to the end of May, 1958, were 60,186 units, representing an increase of 82·5 per cent. over the previous twelve months. During the month of May alone, 12,845 fridges were sold by these boards, an increase of 182·9 per cent.

● In this age of big corporations, it is perhaps not surprising to learn that even two such powerful and autonomous bodies as the American Society of Heating and Air-Conditioning Engineers and The American Society of Refrigerating Engineers have thought fit to take active steps to merge the two societies. The ASRE members in attendance at their 54th annual meeting authorized submission of this proposal for balloting by the ASRE membership. Mr. E. R. Queer, ASHAE president, and Mr. Cecil Boling, ASRE president, have further announced that present plans contemplate that the proposal for a merger and proxy ballots will be officially mailed to the members of both societies in late October. Ballots will be taken in person or by proxy at the 45th semi-annual meeting of ASRE in New Orleans, La. on December 1, and at a special meeting of the ASHAE membership at the same date. In Britain, of course, refrigeration and heating engineers share the same training and educational facilities but tread separate paths when equipped with their diplomas.

● More and more attention is being paid by the medical profession to the life-saving applications of refrigeration. A few weeks ago, the Lord Mayor of Sheffield put into commission an additional blood collection vehicle for the Sheffield region of the National Blood Transfusion Service, which will be of considerable value in this vital organization. This vehicle, which is capable of carrying a transfusion team and equipment on detachment for two or more days, is divided into three compartments. In the front is seating for eighteen people, the centre contains two Prestcold refrigerated stores, each of which can hold 180 bottles of blood in crates, whilst the rear compartment has twelve transfusion couches, twenty-six rest beds and equipment sufficient for taking blood from up to sixty donors per hour. As the safe storage of the donated blood is so very important, the power for the Prestcold equipment is provided independently by either a 1½ h.p. petrol engine or a 1 h.p. electric motor.

● When in Denmark recently, we met Mr. Per-Oskar Persson, civil engineer at the Royal Institute of Technology, Sweden; Mr. Persson is, in fact, assistant to Professor Backström. In conjunction with a doctor from the Lovisa's Children's Hospital, Stockholm, this brilliant young man has made a valuable contribution to the development of hypothermic treatment of children by his part in perfecting the " auto-hypotherm " apparatus. When moderating the temperature of a patient in the " auto-hypotherm " the patient is enveloped in a flow of air with a temperature varying between 0 and +50° C. The air flow is forced over the patient with a great velocity by means of a fan, the speed of which can be regulated. When a quick change in temperature is required, the velocity of the air flow is kept at about 21 ft. per sec., whereas when the temperature of the patient should only be kept constant, the speed of the fan should be reduced to give an air flow velocity of about 6 ft. per sec. A compressor cooling unit is used for cooling the air, and electric heating elements are used to heat it.

● Mr. H. G. Goldstein of Sydney was installed as president of the Australian Institute of Refrigeration at the annual general meeting during the convention in that city. Mr. Goldstein has been a power of strength in the New South Wales division of the A.I.R., and is editor-in-chief of the Institute's *Journal*, and practises what he preaches—to use every endeavour to advance the progress of the Institute. As the head office of the A.I.R. is situated in Melbourne, making it impossible for the president residing in another state to attend council meetings, it is the practice to appoint the Victorian divisional president to act as his deputy; in this instance, the duty falls upon Mr. F. L. Goodman.

● From our Australian correspondent also comes

some sad news, namely, of the passing of Mr. R. R. Sinclair, managing director of J. Wildridge & Sinclair Pty. Ltd., just after leaving his office in Sydney. "Rod," the name by which he was known by many engineers all over Australia, was doing a remarkably fine job for his firm, particularly with large air-conditioning installations in several of the large buildings in Sydney, and other refrigerating projects in other states. He was a member of the New South Wales division of the Australian Institute of Refrigeration and had assisted greatly in the progress of that division. Even for the recent convention he had prepared a comprehensive lecture on "Recent Australian development in the rapid freezing of meat." Unfortunately, his funeral was the day before the date programmed for his lecture. It can be said that he was one of the leading refrigerating engineers of Australia. Our correspondent was associated with "Rod" from 1922, when he returned to Australia after graduating as a mechanical engineer in England. The late Mr. Sinclair was a cousin of Engineer-Commander W. R. Sinclair of the Lightfoot Refrigeration Company Ltd., Wembley.

● The holiday season brings thoughts of cruising in foreign waters and Americans in particular are fortunate in being able to enjoy the benefits of full air-conditioning in the recently converted, famous Cunarder *Mauretania*. Like her younger sister *Caronia*, the *Mauretania* begins her cruises mainly from Atlantic seaboard ports. After her refit with air-conditioning (every cabin, including the crew accommodation, galleys, pantries and public rooms are connected up to the new air-conditioning plant, the refrigeration side of which is by J. & E. Hall Ltd.), the ship was chartered for the first cruise by the New York Liqueur and Packers' Association, who provided free drinks for all passengers during the entire cruise! It is, therefore, not surprising to find that 90 per cent. of the passengers had booked annually for this cruise for the past eight years. They were all most interested in the new air-conditioning system, which had been given very wide publicity in America.

● The British Food Fair (Olympia, August 28 to September 11) will bring together epicurean delights from all parts and refrigerated display cases, for their proper presentation, will abound. The organizers—the Food Manufacturers' Federation Incorporated, and the sponsors, the *Daily Express*—are quite convinced that the 1958 Food Fair will be most colourful and attractive, and judging by the enthusiasm already apparent, there is every chance of the 1956 attendance figure of 502,000 being exceeded.

CHAMBERS WHARF AND COLD STORES LTD.

AT the thirty-first annual general meeting of Chambers Wharf and Cold Stores Limited held at 3, Lombard Street, London, Mr. Charles Goldrei, chairman and managing director, presided.

The following is his statement which had been circulated with the report and accounts:—

"The annual accounts now presented reflect the results of a very busy year for your company and show a notable increase in profit over that of the previous year.

Profit and Loss Account

"The net profit for the 52 weeks ended March 28, 1958, after charging depreciation and other administrative expenses but before taxation was £350,476, compared with £286,397 for 1956-7. Taxation absorbed £204,598, leaving a balance of profit remaining of £145,878 against £120,381 for the previous year.

"The sum of £6,000 has been placed to staff pension and benevolent account to make up the deficiency revealed by the actuaries' quinquennial report. £55,000 has been transferred to general reserve. Your directors propose the payment of a final ordinary dividend of 15 per cent., making 21½ per cent. for the period against 19 per cent. last year; this will absorb £53,659, leaving £19,273 balance of unappropriated profit to be carried forward.

Developments

"The extension to our riverside jetty referred to in my last year's report is now completed. In consequence, the company has one of the finest jetties on the riverside; the improved facilities will enable the company to operate with greater flexibility. Future extensions to our riverside cold storage capacity and warehouse accommodation continue to be planned in accordance with the policy of your board to develop the company's property to the best advantage.

Staff and Labour

"Again I should like to express on behalf of the board and also of the shareholders our appreciation and thanks for the efforts of all the employees who have made the results of the past year possible, and feel sure that we may again confidently look forward to their continued support and co-operation.

Capitalization

"During the meeting the chairman announced that an extraordinary general meeting would be convened to consider a proposal to capitalize £207,377 of the undivided profits of the company. If the proposal is accepted, ordinary shareholders will receive one additional fully paid ordinary share in respect of each three ordinary shares held."

NEWS OF THE MONTH

Refrigeration and A-c. Exports.—During June, 1958, air-conditioning and refrigerating machinery (commercial and industrial sizes) to the value of £523,541, weighing 766 tons, was exported from the United Kingdom. Comparable figures for June 1957 were 1,394 tons, worth £952,367.

* * *

Exports' Analysis.—Of the 766 tons of air-conditioning and refrigerating plant worth £523,541 exported by Great Britain in June—quoted in the preceding paragraph—32 tons went to the Union of South Africa, 11 tons to India, 20 tons to Australia, 18 tons to New Zealand, 102 tons to Canada, 197 tons to "other Commonwealth countries," 30 tons to Eire, 18 tons to Sweden, 51 tons to Western Germany, 24 tons to the Netherlands, 17 tons to Belgium, 10 tons to France, 107 tons to Italy, and 129 tons to "other foreign countries."

* * *

Refrigeration Plant Classified.—Of the total exports of air-conditioning and refrigerating machinery during June, quoted in the first paragraph commercial refrigerators accounted for 144 tons, worth £84,977, industrial plant and equipment for 144 tons worth £84,977, and parts for all non-automatic refrigerating machinery, for 280 tons, worth £192,893.

* * *

Exports of Small Refrigerators.—During June, 1,062 tons of complete refrigerators (domestic, including complete mechanical units) were sent overseas from Great Britain. These exports were worth £697,108. The 1,062 tons comprised 33 tons to the Union of South Africa, 14 tons to Rhodesia and Nyasaland, 2 tons to India, 46 tons to New Zealand, 481 tons to "other Commonwealth countries," 2 tons to Sweden, 34 tons to Western Germany, 18 tons to the Netherlands, 38 tons to Belgium, 60 tons to Italy, and 333 tons to "other foreign countries."

AMERICAN SHOPPING IN BRITAIN

SEVEN years ago R.A.F. Station, Upper Heyford, Oxfordshire, was handed over by Air Vice-Marshal A. Hasketh to Lieut.-Colonel Frank A. Roper, U.S.A.F., on loan to the United States Air Force. Since then it has been the home of a great number of American servicemen, many of them having their families with them. To-day, this base, which forms a vital function in the Strategic Air Command has, in addition to the many service personnel, over 400 families living there.

Living, as they do, so far away from the nearest shopping centre, the United States Air Force has provided a comprehensive self-service store which also serves many other service families who live in the area. Supplies of every necessary commodity are available for sale, numerous items being kept in stock. As would be expected in a

The British display cabinets at the U.S. Strategic Air Command base.

store of this type, refrigeration plays an important part. Amongst the equipment in use are six Prestcold " Farmoor " display cabinets, four of which are in continuous line arrangement and used for prepacked meat, whilst the other two are for frozen foods. Clean contemporary styling, concealed fluorescent lighting and clear visibility all help these silent salesmen to do their work.

Also in use is a Prestcold multi-deck cabinet, which is being used for fruit and vegetables. This equipment together with the "Farmoor" display cases was supplied by the Southern Electricity Board of Oxford, and performs a very useful function in a community which could well be described as a small but important and interesting section of America in England.

REPLANNING IN THE MIDLANDS

Opinion is divided in Meriden. Some businessmen feel that with the opening of the new Meriden by-pass, trade will drop to a mere trickle ; others feel that the busy traffic now using the road is a strong deterrent to local shoppers ; but with this traffic diverted to the by-pass, the consequent increase in parking space and lessening in noise and bustle will encourage housewives and casual shoppers to " have a look round the shops " more frequently than they do now.

One of the firmest believers in the latter view is Mr. F. Collett, who owns a grocery store in Meriden. Mr. Collett is so convinced that the new by-pass will have beneficial effects on trade that he has completely renovated his premises. Its appearance now is a striking blend of the modern and tudor. The interior is a strong but pleasing contrast of oak beams and pastel shades of paint. Perhaps the most unexpectedly effective item is a smart, contemporary refrigerated display cabinet for displaying and protecting cooked meats, provisions and dairy products. The model is the " Server " and was installed by Refrigeration (B'ham) Ltd., the Midlands Prestcold distributors. Mr. Collett is sure that touches like this can make all the difference to trade in his area when the new highway is built. " Initiative brings its rewards," he says.

PICTURE OF THE MONTH ★

Princess Alexandra is here seen leaving the York Shipley stand at the Royal Kent Show at Maidstone last month, in the company of the Lord-Lieutenant of the county.

New Cold Store for British Transport Commission in Southampton Dock

Premises of the International Cold Storage and Ice Co. Ltd. Described

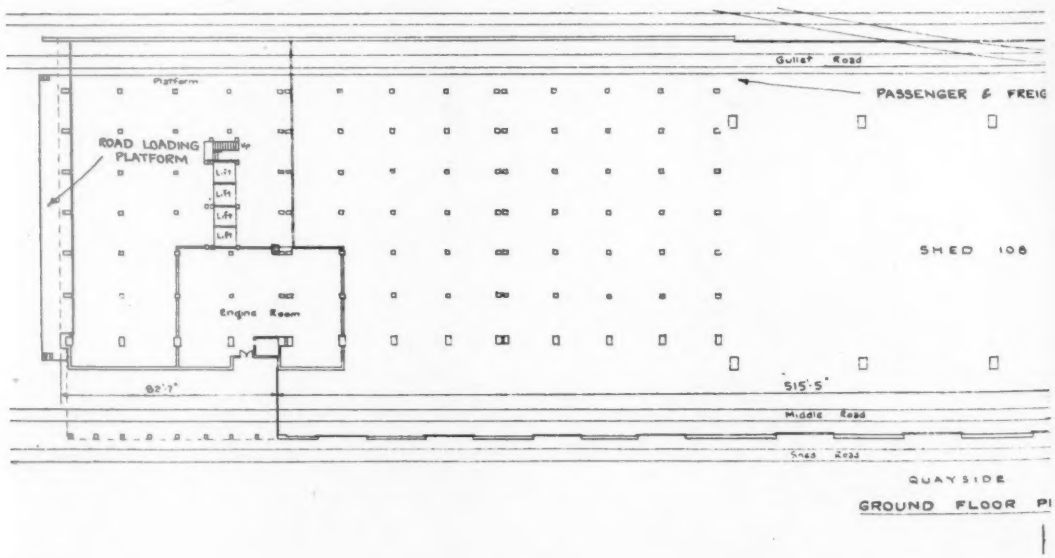
(*Continued from April issue*)

THE original building of the International Cold Storage and Ice Co. Ltd. in this port was built in 1902 and served the area for many years until it was destroyed by enemy action in 1940. The original cold store was located in the old dock and was equipped with Sterne's refrigeration plant, as already mentioned.

It was decided to erect a new cold store in place of the one destroyed in the old dock and the site selected comprised berths no. 108 and 109 in the new dock. This site is at the end of the dock adjacent to the King George V drydock, the largest in the world.

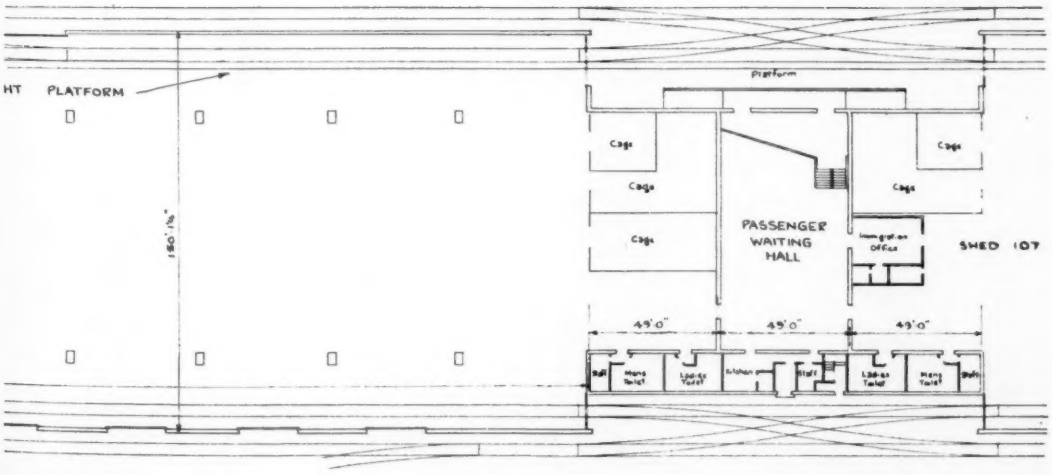
The new cold store, which still trades under the name of the International Cold Storage and Ice Co. Ltd., was erected by Sir Robert McAlpine & Sons Ltd. and is of reinforced concrete construction for all floors and columns, the external walls being built in 9 in. reinforced brickwork. The building was designed by the British Transport Commission's own staff under the chief docks engineer, Mr. J. H. Jellett, O.B.E., M.I.C.E. The building has many novel features and is a refrigerating engineer's paradise as there are no beams in the ceiling of the chamber thus eliminating any pockets in the cold room circuits. From the insulation point of view, the cold store is of envelope construction and embodies many up-to-date trends and is an effective cold store with a life equal to anything yet erected.

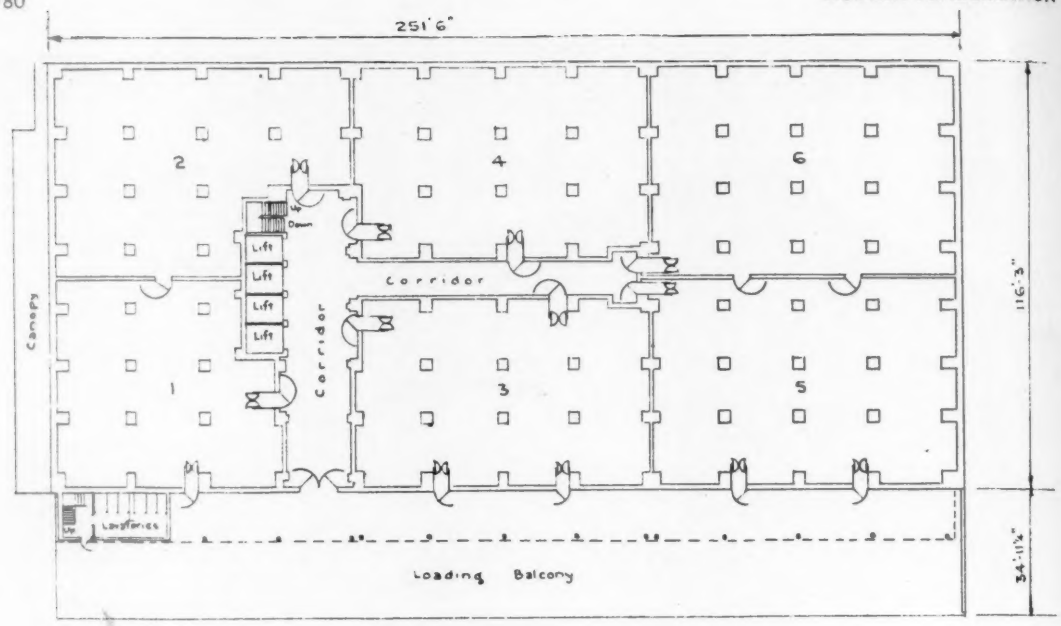
The building which is 250 ft. long x 150 ft. wide x 60 ft. high has two refrigerated floors with provision made for a 50% extension at a future



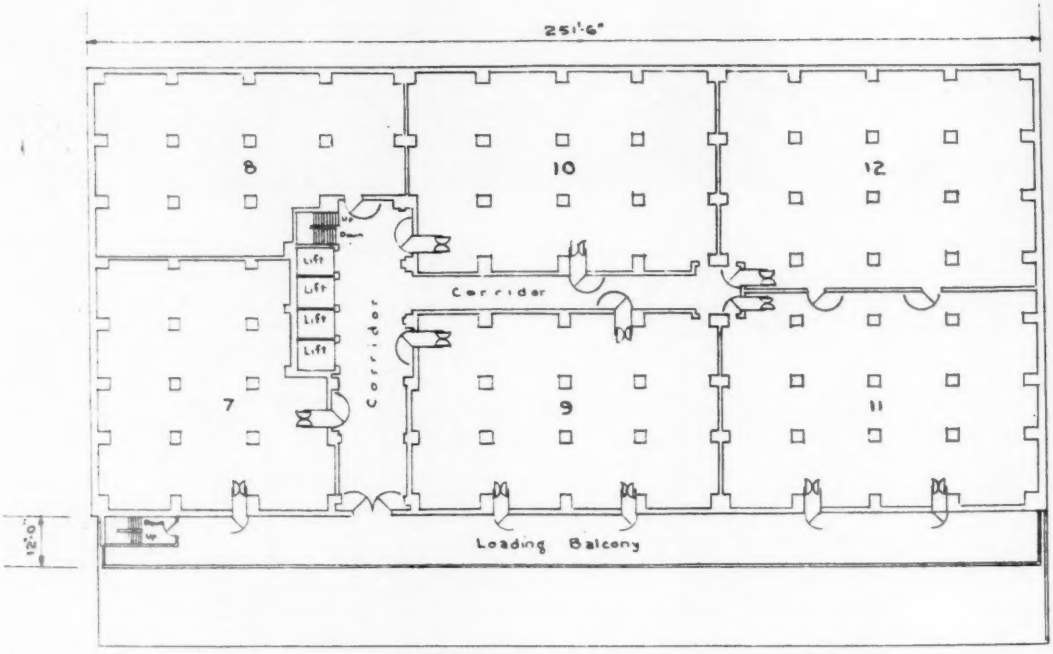
This view of the building illustrates its unique position for handling road, rail and sea traffic.

View along the reception deck, with R.M.S. "Queen Mary" berthed adjacently.





FIRST FLOOR PLAN
COLD STORAGE



SECOND FLOOR PLAN
COLD STORAGE

Typical first - floor chamber fitted with direct expansion cooling.

date. The ground floor is unrefrigerated and contains the engine room and efficient handling space. Part of the ground floor space has been sealed off and is being used as a bonded warehouse. The produce to be stored can be unloaded at the quay level or on to the balconies at the

One of the four rooms on the second floor arranged for forced air circulation.

first and second floor levels by means of the quay-side cranes.

Four 30 cwt. lifts are provided in the centre of the building and operated from the central corridor. The layout of the cold store and the structure are shown in the foregoing illustrations and it will be agreed that a great deal of thought has been given to the building for efficient handling of the goods into and out of the store.

The refrigerating equipment was made and installed by L. Sterne & Co. Ltd.

The cold store has six chambers on each of the first and second floors and provision has been made for six cold rooms on the third floor level. First floor rooms are designed for a temperature of 15° F. and are arranged for cooling by direct expansion, the grids being arranged in suitable banks on the underside of the ceiling. They are made from 1½ in. nominal bore. The coils are continuously welded and the length of each circuit does not exceed 800 ft. The grids are carried from special inserts which were cast *in situ* in the concrete ceiling.

The second floor has four rooms cooled by forced air circulation which are capable of being held at temperatures of 35° F. to 15° F. The remaining two rooms on this floor are arranged for direct expansion cooling, one room being held at -10° F. and the other at -20° F. The piping in the -10° F. room is double-banked on the ceiling and in the -20° F. ceiling it is double-banked on both the ceiling and the walls.

The third floor, when refrigerated, will be held at 15° F. and will be cooled by forced air circulation although provision has been made in the ceiling inserts so that, if desired, these can also be arranged for direct expansion piping.

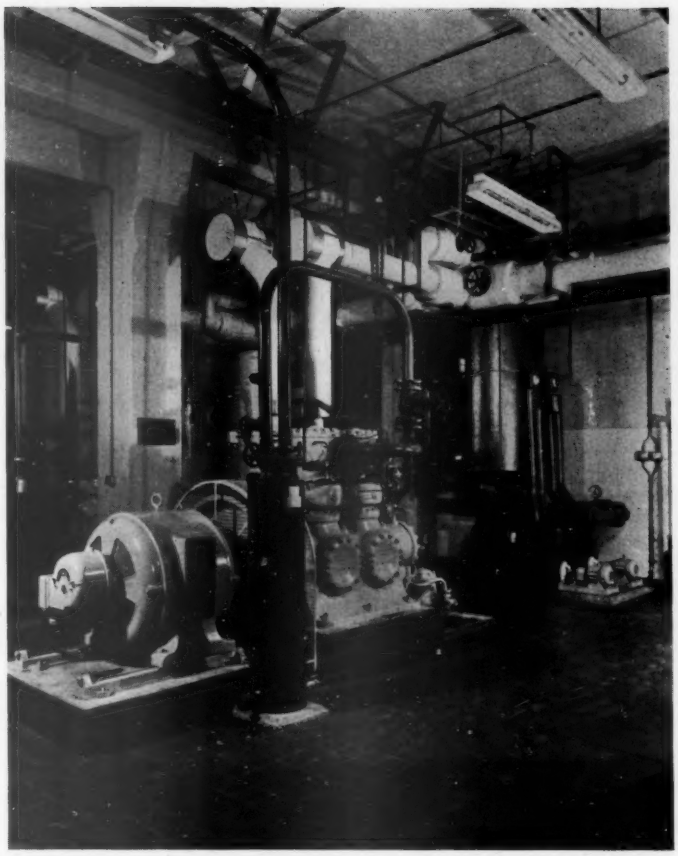
The British Transport Commission gave a great deal of thought to the type of insulation to be used

Above: These solidly built chamber doors close with the precision of a domestic fridge door giving "finger touch" action.

Left: Business-like arrangement of pipework at end of a typical corridor.

and decided to adopt traditional methods and use best quality Portuguese compressed slab cork at between 7½ and 8 lb. per c. ft. The cork insulation is generally in a thickness of 8 in. being built up in suitable thicknesses with broken joints. The insulation is finished in Portland cement and sand with granolithic paving on the floors. Normal vapour seal procedure has been followed on all the walls. The finish to the ceiling and frieze areas of the walls is Portland cement and sand in two coats to a double thickness of $\frac{5}{8}$ in.—this is trowelled to a smooth finish with "v" cuts arranged in the surface work to allow for expansion and contraction. The efficiency of the "v" cuts has been found during the cooling down period as very few cracks have developed. The whole of the insulation work was carried out by W. A. Taylor Ltd. of Pitcairn Road, Mitcham, Surrey.

A special feature of this contract is the construction of the doors, which are manufactured from an exceptionally high quality clear rift-sawn Douglas fir, which has an attractive appearance, being completely free from any knots or defects, and has been brought to a rich golden colour; it has been given three coats of "Copal" carriage varnish, which is indestructible over many years' service.



The red-tiled engine-room is something of a show-place. This view takes in less than half the area.

The hinges and fasteners are of the most up-to-date type, and the principle on which these doors are hung is a "finger touch" shutting and opening. "Panelec" type low voltage resistance heaters are fitted to the doors, with "Sunvic" controllers, and the doors facing outwards to the jetty are protected against weather with galvanised steel sheeting.

Dados are of solid cement and sand of a very strong mixture being 1¼ in. thick to take the buffeting from the trucks and carcases; they are carried to a height of 4 ft. All walls and columns are protected with timber cargo battens.

The floors are 2½ in. thick paving in Cornish granite chippings, with the exclusion of all sand, and using only clean granite and granite dust with Portland cement. The floors are laid in squares with bituminous filler in the joints.

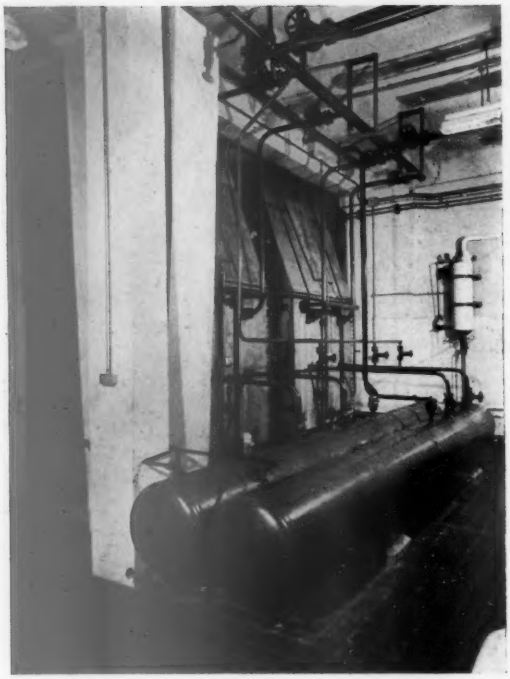
All the direct expansion grids are arranged in suitable circuits of welded construction and arrangement has been made for defrosting of the grids by means of hot gas.

The air cooling batteries are designed for flooded operation controlled by low pressure type float valves.

Water defrost has been arranged for the batteries—the water being pumped from a hot water tank, thermostatically controlled and located in the engine room.

On the return circuits from the 15° F. direct expansion and air cooled rooms, interceptors have been incorporated with a liquid heating coil in the base of each interceptor.

As the Sterne 2Y 10½ type compressors which had been installed in the old cold store were in good shape, it was decided to reuse the three



Forced draught type condensers take fresh air direct from the quayside.

compressors at the new cold store and to install a mark 3WC compound compressor with liquid sub-cooling on the low temperature circuits.

The low temperature grids are arranged for flooded operation by pump circulation, the accumulator and pumps being located in the engine room.

Provision has been made in the engine room for a future standby unit for the low temperature rooms but in the meantime the whole of the plant is cross connected so that in the event of a failure of a compound compressor the duty can be taken care of by one of the 2Y 10½ compressor units.

The condensers, two in number, are of the forced draught type being Sterne's standard FDB60—each unit being complete, having its own elimination fans pump and tank and having a nominal rated capacity of 66 tons refrigeration. These condensers are located in the recess in the engine room with fresh air direct from the quayside. The air is discharged through trunking and carried to the outer edge of the lower balcony.

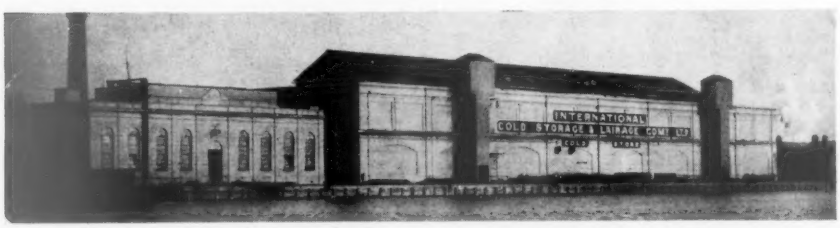
Two liquid receivers have been provided, one for each condenser and these are also located in the engine room as will be seen by the photographs. A full set of crossovers have been provided in the engine room so that any of the single acting compressors can be concentrated on either the direct expansion or the air cooling battery circuits. The hot gas connections to the two condensers are common to all machines. The suction, liquid, and hot gas mains to the various rooms are carried through a duct at the side of the lifts and supplementary mains have been carried along each of the corridors.

The headers and valves for the direct expansion rooms are located in a convenient position adjacent to the door of each cold chamber, this giving easy access to the engine room staff.

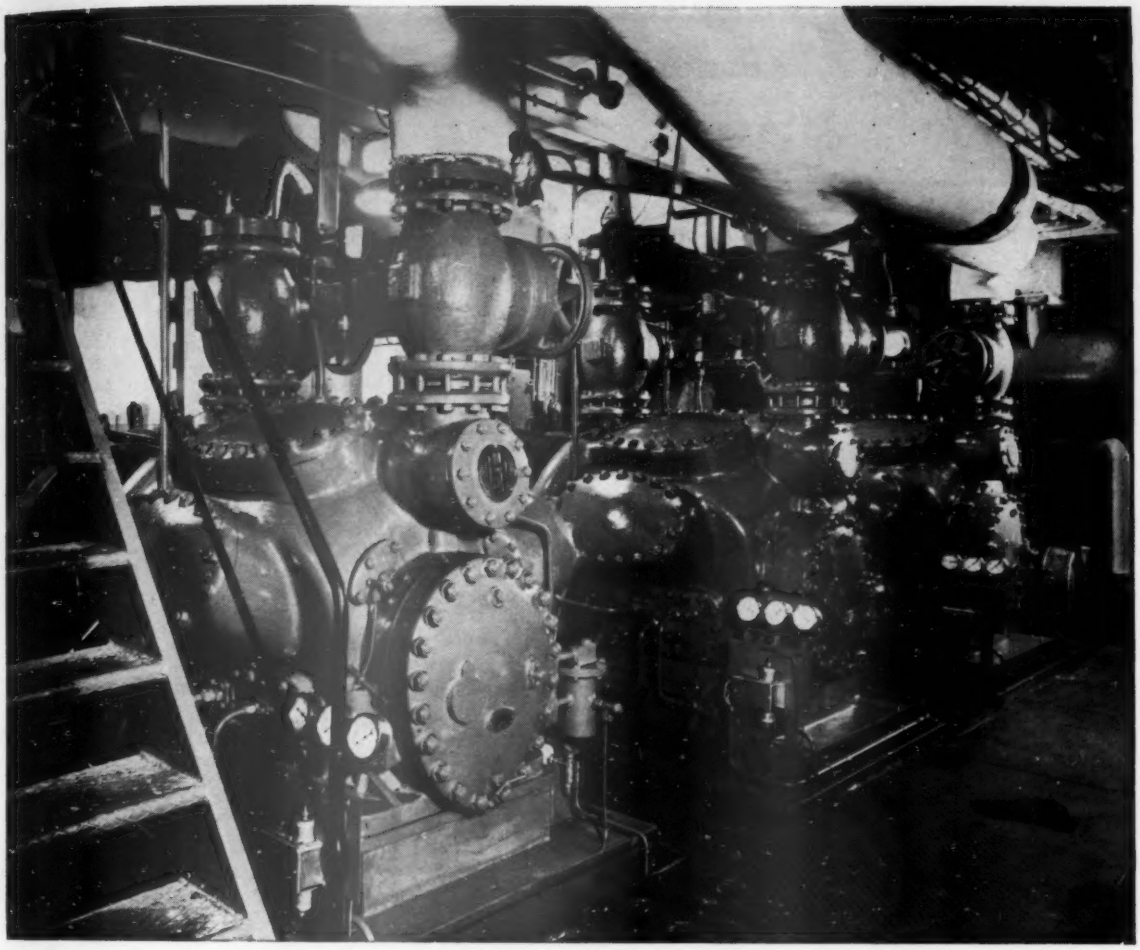
All the electrical work on the site was carried out by British Transport Commission's own electrical department.

All the equipment at the store are to Lloyd's requirements and all parts have been tested to their satisfaction as regards pressures and temperatures.

The store is now in full operation in the capable hands of the International Cold Storage & Ice Co. Ltd. A fully-laden vessel, *Brisbane Star*, discharged alongside last month at a rate of over 1,100 carcases of lamb per hour from each hatch, and was the first ship so to do.



The original building of the International Cold Storage & Ice Co. Ltd. in the Old Docks.



Refrigeration

J. & E. Hall Ltd., with seventy-five years of experience in the design and manufacture of refrigerating compressors and accessories; offer equipment ranging from small refrigerated cabinets with compressors of ¼ h.p. to large ammonia compressors requiring motors of several hundreds of horsepower. Today, over 65% of the refrigerated cargo space in the world's shipping is cooled by equipment of J. & E. Hall's manufacture.

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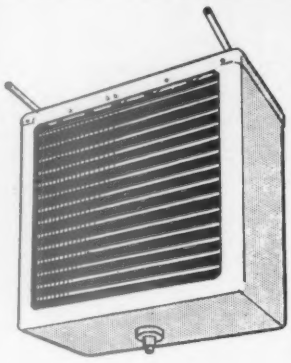
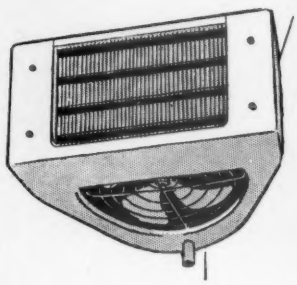
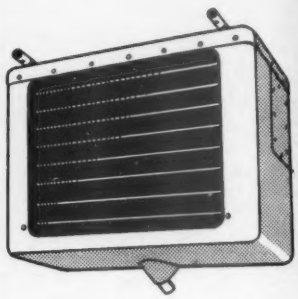


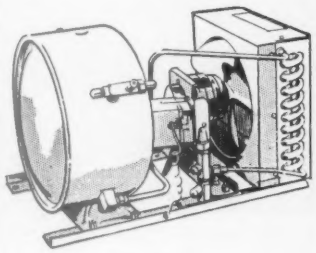
LTE COOLERS



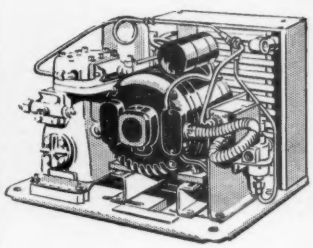
CFC COOLERS



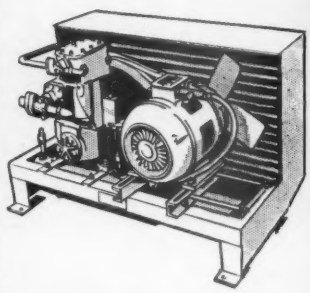
HTE COOLERS



SEALED CONDENSING UNITS



WATER COOLED CONDENSING UNITS



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COOLERS/CONDENSING UNITS MR 8

EXPANSION OF THE MARCO ★ ORGANIZATION

THE development of Marco Refrigerators Limited from one of the smaller producing units in the refrigeration industry pre-war to the front rank of commercial equipment makers to-day has been an outstanding feature of this field over that period.

The new board has followed a policy, these last few years, of re-equipment and streamlining of the works at Streatham. This objective could not have been reached, however, on the former basis of endeavouring to cater for the commercial *and* domestic sections of the trade, and the latter category does not now come within the scope of operations at Rowan Road.

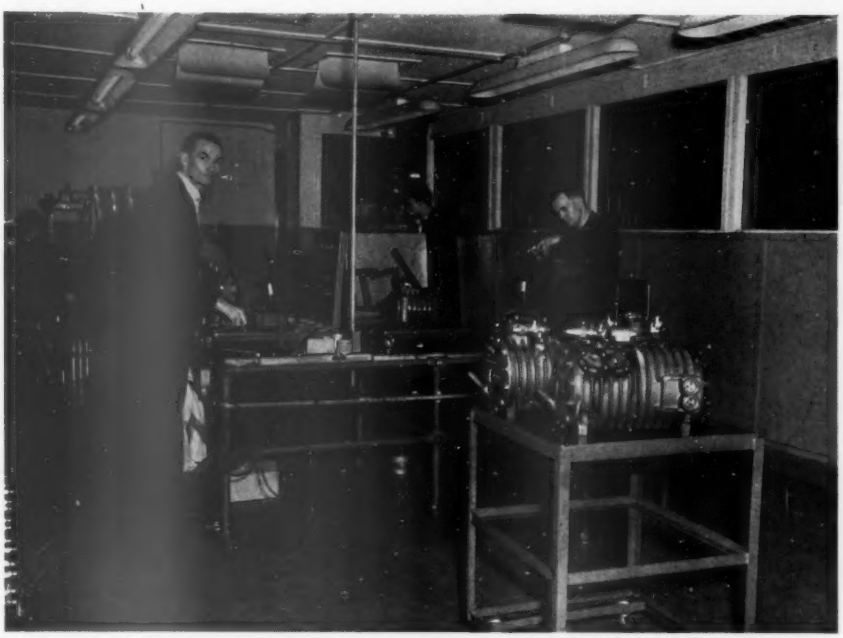
Undoubtedly, one of the factors contributing enormously to the proud position which Marco now holds has been the success of their service—accessible, hermetic condensing unit—the "Serviseal."

The reliability of this unit, which meets the demands of the commercial field within the range of ⅛ to 2-h.p., has brought patronage from such quarters as the House of Lords, the L.C.C., British Railways, the armed forces, the U.S.A.F., and many large stores such as Woolworth's, Lipton's, Peark's, United Dairies to quote a few of Marco's leading customers. Not only are q.-f.f. cabinets supplied to these customers but also models in the higher temperature range.

A tour of the Streatham works reveals what changes have been made to cope with this greatly expanded demand. For instance, in the compressor shop, an air-conditioned bay has been built since last we visited this section. Under dust-free and dry atmospheric conditions the "Serviseal" unit is now assembled. Particularly interesting are the Marco-built jigs for holding the units while they are being given attention ; mounted on a universal joint, these units have complete manoeuvrability which allows the operator unusual freedom of movement.

Marco's standardization on an ice-blue finish for these units has added to their appeal.

In the cabinet manufacturing shops, too, much new plant has been installed. A Rhodes 150-ton press takes care of bending and forming operations for the upright service cabinets which still constitute an important line of manufacture, ranging from 13 c.ft., through 15-c.ft. and 25-c.ft. models, to the 40-c.ft. "Astoria." The first mentioned, 13-c.ft.



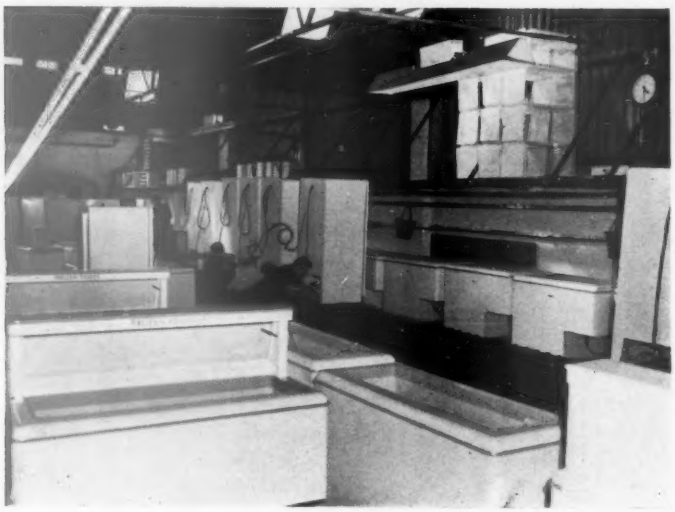
The air - conditioned assembly shop for units at Streatham.

The 150-ton Rhodes press.

" Victor," is also available as a 16/18 stone wet fish cabinet. Frozen food cabinets are being turned out in standard 4-ft., 6-ft. and 8-ft. lengths to form the " Majestic " models, with three display decks, while " Monarch," " Marcold," " Marview " and " Marquis " are variations for chilled or low temperatures.

On the ice cream side, " Maxstor Major " and " Minx " are conservators without display that are meeting a wide demand ; once again, Marco's are providing display cabinets for the Ice Cream Alliance's 1958 annual competition.

While the above notes would indicate that Marco's are now equipped on a batch production basis, the directors have not set aside entirely the policy of building " specials," particularly for the Government departments. As an illustration of this may be cited the new blood-storage cabinet. In contrast to the conventional blood-storage cabinet, Marco's have designed and built an entirley new type of conservator, constructed for the War Department engineering service. It is designed to maintain a temperature of 4° C. (plus or minus 1° C.), in an ambient of 44° C. The capacity is for 40 standard one-pint bottles stored in two wire baskets, each containing 20 bottles. The cabinet,



Many types of refrigerated cabinets are here to be seen undergoing final testing.

which stands 3 ft. 7 in. high by 2 ft. 5 in. wide by 1 ft. 9 in. deep, is finished in white stoved enamel and has a lift-up lid fitted with a chromium-plated quick-release fastener and a spring-loaded hinge. An automatic action light is fitted on the inside of the lid. A panel mounted on the front of the cabinet houses a 4-in.-diameter dial thermometer, and a special warning device consisting of a bell and red light which are operated by two independent thermostats taking their current from a separate 4½-volt battery. The warning system operates if the average temperature inside the cabinet rises above 6° C. or drops below 2° C. To enable the battery and warning device to be tested, a two-way switch with a central off position is incorporated in the circuit. This cabinet is, of course, powered by the "Serviseal" unit, and while on test in the company's laboratories, it was found that the temperature at all points of the cabinet did not vary by more than ½° C. Many advantages are to be found in the new type of cabinet, not the least important is the fact that the rise in temperature by opening the lid is considerably less than the rise caused by opening the doors of a more conventional cabinet.

With policy-making and general administration in the capable hands of Mr. E. G. Batt, Mr. R. J. Simpson and Mr. E. A. Leach, the rapid progress of Marco's along their newly chosen path should be maintained and quite likely accelerated.

New blood storage cabinet, photographed before wiring and tubing had been finally positioned.

New Companies

(*see also page 824*)

The accompanying particulars of New Companies recently registered are taken from the Daily Register compiled by Messrs. Jordan and Sons Ltd.

Uhlhorn Bros. (Insulation) Ltd., 51–53, City Road, E.C.1. Secretary: Hans Uhlhorn. To carry on the business of manufacturers of and dealers in insulating and plastic substances, etc. Capital: £100. Directors: Walter H. Uhlhorn, (permanent), 67, South Way, N.W.11; Kenneth P. Tempest, 384, Seven Sisters Road, N.4.

* * *

Uhlhorn Bros. (Plastics & Rubber) Ltd., 51–53, City Road, E.C.1. Secretary: Hans Uhlhorn. To carry on the business of manufacturers of and dealers in insulating and plastic substances, etc. Capital: £100. Directors: Walter H. Uhlhorn, 67, South Way, N.W.11; Charles Uhlhorn, 58 Hall Lane, N.W.4.

* * *

Cemoss Equipment Ltd., 5 Grange Court, Waltham Abbey, Essex. Secretary: Cisley Moss. To carry on business of suppliers and manufacturers of domestic and industrial insulation materials, etc. Capital: £100. Directors: Cisley Moss, 5 Grange Court, Waltham Abbey, Essex; Rose M. Orriss, 66 Hova Villas, Hove.

Air Coil Products Ltd., 290a, St. Pauls Road, N.1. Secretary: Alec J. S. Atkin. To carry on business of designers, manufacturers and distributors of heat transfer equipment, including air-conditioning equipment, etc. Capital: £100. Directors: Leonard P. Dack, 21, Radcliffe Road, N.21; John B. Dukes, 16, Rolt Street, S.E.8; Ernest H. Wood, 24, Pembroke Gardens, Palmers Green, N.13.

* * *

Associated Insulation Products Ltd. Capital: £100. Directors: not named. Subscribers: Lawrence E. Peterken, 37, Tabor Court, Cheam, Surrey (assistant to co. secretary); Richard M. A. Braine, Crown House, Aldwych, W.C.2 (assistant secretary).

* * *

Abbot's Lane Cold Stores Ltd., 15, Southwark Street, S.E.1. To take over the undertaking and all or any of the property and assets of Wigan Richardson Cold Stores Ltd. Capital: £51,000. Directors: Edgar C. Wigan, Bradstone Brook, Shalford, nr. Guildford; John D. Wigan, Drewitts, Warninglid, Sussex; Francis N. Richardson and David N. Richardson.

Modern Refrigeration is obtainable from the manager, Maclaren House, 131, Great Suffolk Street, London, S.E.1, at thirty-five shillings per annum, post free to any part of the world.

Refrigeration Controls—8

PRESSURE-OPERATED TYPES

By H. H. EGGINTON

(*Continued from July issue*)

Servo or Main Valves

IN earlier articles reference was made to the use of servo or main valves to operate as large capacity suction pressure and evaporator pressure regulators. In their simplest form these valves consist of a cylinder containing a piston, to which is connected a valve mechanism (*see* fig. 21.). Any device which can feed positive pressure to the top of the piston can cause it to move and open the main valve. Such a device is thereby a pilot, and usually passes refrigerant pressure in liquid or vapour form to the piston. In this manner small sensitive valves can use the power inherent in the system, i.e. the pressure, to do work opening and closing a much larger valve mechanism, and the whole is, therefore, a servo system. Further, if the pilot has on/off or modulating characteristics, then the main valve has on/off or modulating action. The use of such valves avoids the need for excessively large prime movers, which would be necessary if large valve gear had to be actuated, or the complexity associated with counteraction of the out-of-balance pressure forces of the larger valves, or the complexity of other servo systems, such as electrical motorized valves. The commonest use of such valves is in suction and evaporator pressure regulators, electro magnetic stop valves and expansion valves, but there seems to be no reason why any pressure transmission system cannot be applied to a servo valve.

Principal Requirements

(1) The valve must be robustly constructed and dimensionally stable. This latter point is important since they are usually castings and piston to cylinder clearances are small.

(2) Piston to spring load and valve area must be such that the valve begins to open with a 1 p.s.i. pressure drop across the piston.

(3) The bleed port in the piston which allows the valve to close when pressure feed is stopped must match the pilot valve orifice so that suitable throttling ranges are achieved.

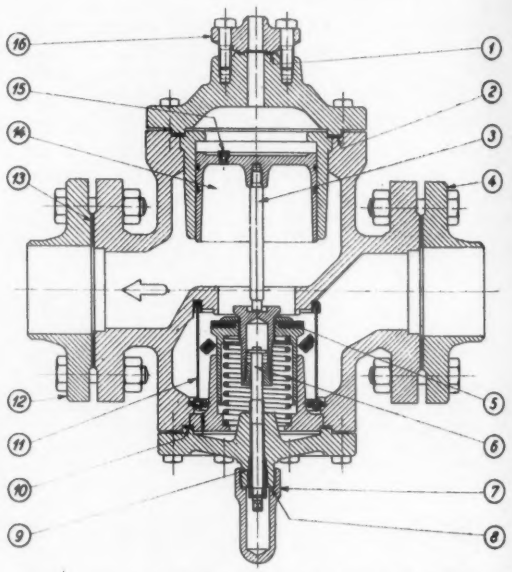
(4) Internal or external filters must be used to protect the valve clearances from dirt.

Construction Details

Iron or semi steel castings are used with mild steel flanges to facilitate welding of pipes. Valve faces are commonly metal to metal or use plastic or synthetic materials to give good shut-off characteristics. In this type of valve " bedding in " of the seat material does not alter the control point because the system rate, i.e. pressure required for a unit movement, is so low that " bedding in " of the seat does not alter spring loads sufficiently to require a different pressure at which to open the valve.

Operating Characteristics

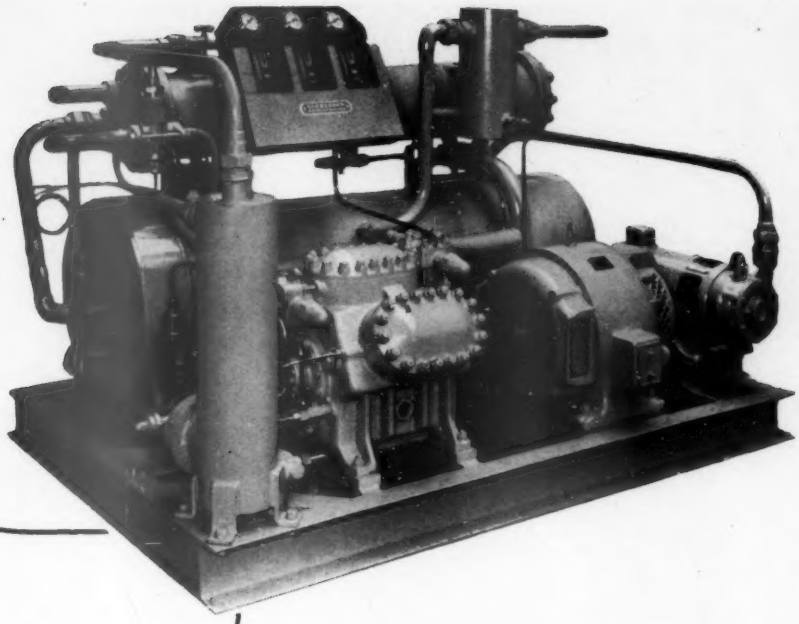
Servo valves have the same operating characteristics as the pilot valve except that a pressure



By courtesy of Danfoss Manufacturing Company, Denmark

Fig. 21.—Section and details of a typical servo valve.

1. Gasket for flange
2. Gasket for top cover
3. Push rod
4. Inlet flange
5. Valve disc
6. Spindle for manual operation
7. Cap
8. Cap seal
9. Stuffing box
10. Gasket for bottom cover
11. Strainer
12. Outlet flange
13. Gasket for flange
14. Servo-piston
15. Equalizing nozzle
16. Flange for pilot connexion



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drop through the valve of some 2 p.s.i. usually exists. This drop is the pressure required to hold the valve fully open and is, of course, appreciably greater if liquid expansion is taking place, i.e the valve is being used as a thermostatic expansion valve. This 2 p.s.i., however, can be compensated in some instances by having an equalizer line connexion from the pilot to the downstream side of the servo or main valve. In this way the pilot responds to the downstream pressure and the pressure drop in the servo valve has no effect on the pilot action.

Considering the action of such a servo valve, fig. 21, it is clear that pressure from the pilot as a result of it opening feeds to the compartment above the piston. At small openings of the pilot valve the pressure bleeds through the equalizing nozzle or bleed port, but as the pilot opens further, the equalizing hole cannot bleed fast enough and a pressure drop is built up across the piston and it begins to be moved downwards, so opening the valve. The actual pressure built up above the piston at the start to open pressure is approximately a quarter of the upstream pressure plus 1 p.s.i.; an increase of a further 1 p.s.i. will open the valve fully. The pilot need only, therefore, meter approximately a quarter of the upstream pressure and can be a small valve mechanism. These pressure values represent the proportions of valve and piston area and the spring rate of the return spring and can therefore, for special applications, be increased or decreased. The change of 2 p.s.i. deals with the relative areas of the upper face of the valve seat compared with the underside of the piston and the load required from the top of the piston to compress the spring to a fully open valve position. The proportion of upstream pressure to be metered by the pilot is in the relationship of the areas of the valve and piston. When the pilot shuts, the pressure in the line between the pilot and the main valve and the space above the piston, bleeds through the equalizer nozzle or bleed hole and allows the spring to return the valve and piston to the closed position.

The chief advantage of the servo system is that the performance and sensitivity of a small pilot valve can be obtained in a large valve mechanism. In addition, a given type of main valve can be used for a variety of duties depending only on the type of pilot.

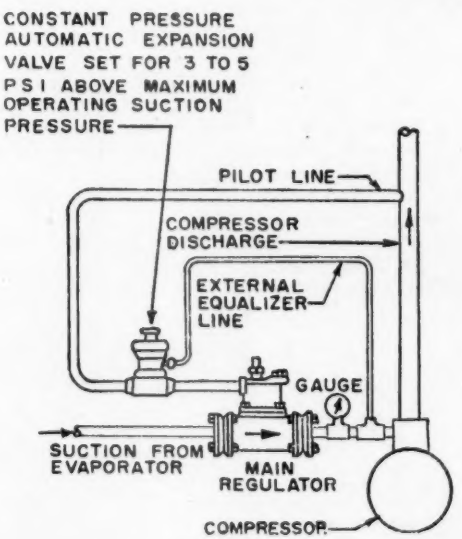
The disadvantages are that such main valves are not tolerant of dirt and unless adequate filters are maintained in good condition, soon become trouble prone. Such valves are commonly sized by seat diameter, being the same as the pipe work bore and should not normally exceed this since the valve closes with the flow and a hammering action may be developed as the valve is about to shut off. There are however, applications where capacity figures based on pressure drop and refrigerant conditions must be used, e.g. when the main valve is operated by an expansion valve.

Application

The principles regarding installing such valves are controlled by the type of the pilot and it is essentially the observation of the rules controlling fitting of the valve which must be observed.

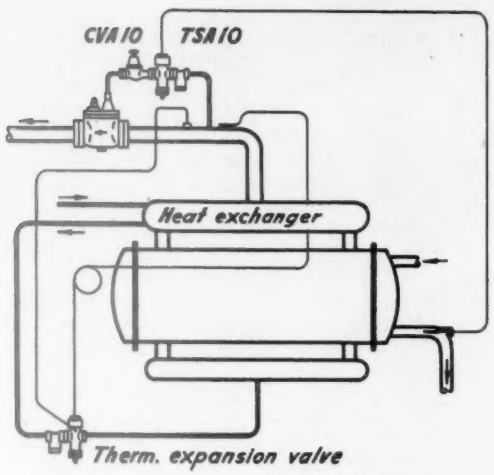
Due to sensitivity of servo valves in respect of responding to pilot action, they must be matched with the pilot to avoid hunting conditions, bearing in mind that an oversize pilot can lead to rapid opening and closing of the main valve and hence initiate hunting.

The use of servo valves has been illustrated in the articles on suction pressure regulators, but some unusual and interesting applications are shown in figs. 22, 23 and 24. Fig. 22 shows the use of a servo valve and equalizer suction pressure regulator to avoid the pressure drop that is normally required through a servo valve to cause the valve to be fully opened. In this case the discharge pressure of the compressor is metered to the piston via the pilot valve, so no suction pressure drop is incurred in the main valve. Such an arrangement is of considerable value in low temperature work where a large pressure drop would mean a severe reduction of capacity of the



By courtesy Alco Valve Company, U.S.A.

Fig. 22.—Use of servo valve with equalized suction pressure pilot to avoid pressure drop on low temperature work.



By courtesy of Danfoss Manufacturing Company, Denmark

Fig. 23.—Circulated liquid cooler with servo valve controlled by evaporator pressure and thermostatic pilots.

machine. The bleed of high temperature discharge gas in such an assembly is small enough to be ignored in the general capacity of the regulator and only increases very slightly the superheat on the vapour which has already done its useful refrigeration work in the evaporator. Fig. 23 illustrates the use of a servo valve with combined pilots; TSA. 10. is a thermostatic evaporator regulator or throttling valve and CVA. 10. an evaporator pressure regulator. The thermostatic evaporator regulator is in construction similar to a thermostatic expansion valve, except that it does not sense evaporator pressure, i.e. it merely opens and closes on rise and fall of bulb temperature. The picture shows a direct expansion circulating liquid cooler where the control of the evaporator is by thermostatic expansion valve. The circulating liquid or medium to be cooled is held at constant temperature by the thermostatic evaporator regulator sensing the temperature of the outgoing liquid and causing the main valve to open and close, so controlling the flow of vapour from the evaporator according to the temperature of the liquid. In addition, the evaporator pressure regulator acts as a protection device for the temperature of the evaporator and can be set to close down well within the freezing point of the circulating medium and at any predetermined point. The use of this valve is particularly advantageous when the rate of draw off of cooled medium varies (note the respective location of phial bulbs, equalizer lines and suction tappings). A similar arrangement of controls can be used with forced draft or blown coolers, where the thermostatic valve controls room temperature and the pressure regulator prevents dehumidication of the air or frosting of the evaporator.

Fig. 24 shows the use of a thermostatic expansion valve as a pilot operating a main valve, with a magnetic or solenoid valve acting as a stop valve through the main valve in conjunction with the stopping and starting of the compressor. In this application, to a shell and tube water cooler, the action of the pilot thermostatic expansion, which is a small conventional type, feeds refrigerant pressure to the piston of the main valve causing it to actuate in sympathy with the pilot. The pressure drop through the evaporator system is compensated by the equalizer line, which it will be noted is mounted downstream of the bulb location of the pilot valve. In this arrangement, therefore, a very large capacity expansion valve system is obtained without the complication of double beat valve mechanism, or other valve arrangement to avoid out-of-balance forces associated with large valve areas.

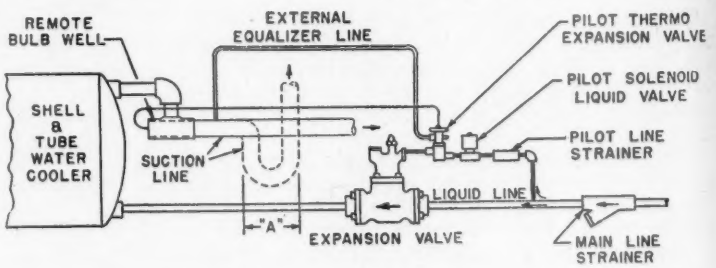
Trouble Shooting

Because servo valves are, in effect, converted by the action of the pilot to the characteristics of the pilot, it is difficult to lay down a trouble-shooting chart. Any malfunctioning should first be

(*Continued on p. 813*)

By courtesy Alco Valve Company, U.S.A.

Fig. 24.—Servo valve controlled by thermostatic expansion valve and solenoid valve pilots.



NOTE: WHEN SUCTION LINE RISES DIMENSION "A" SHOULD BE AS SHORT AS POSSIBLE

BRITAIN'S LARGEST STORE WITH 100 PER CENT. CELLULAR PLASTIC INSULATION

DRIVE and initiative are certainly revealing themselves in the leadership of Carlo Gatti's to-day. The great grandson of the founder, Mr. A. Corazza, is using both in the modernization of this firm's plant and machinery.

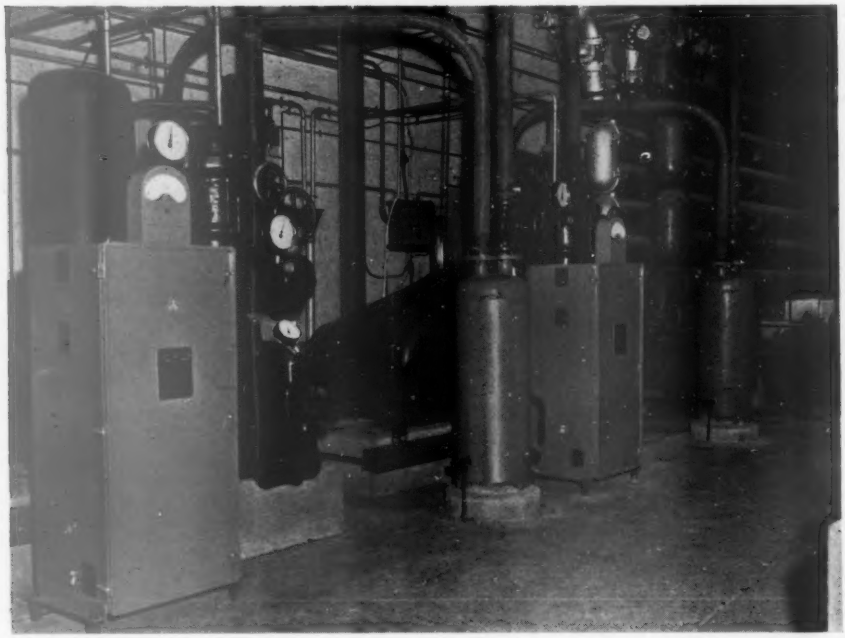
When, after war damage, rebuilding was commenced, a new and modern freezing plant was installed in an engine room an eighth of the size of the original plant built in 1912, with an output of double the original capacity of the former plant.

A portion of the ample loading bank. On the left is Mr. A. Corazza, chairman and managing director; in the centre is Mr. T. H. Kent, the building contractor and, on the right, Mr. R. A. Guest.

The large first-floor chamber showing one of the hatches, with builder's ladder temporarily placed through it for emphasis.

This allowed a substantial building to become redundant at a time when, contrary to most people's belief with the progress of refrigerators, the market for ice was more than holding its own.

Before this company made ice it imported the natural product from Scandinavia and stored it



The engine room showing Sterne's compressors, starters and the original condensers.

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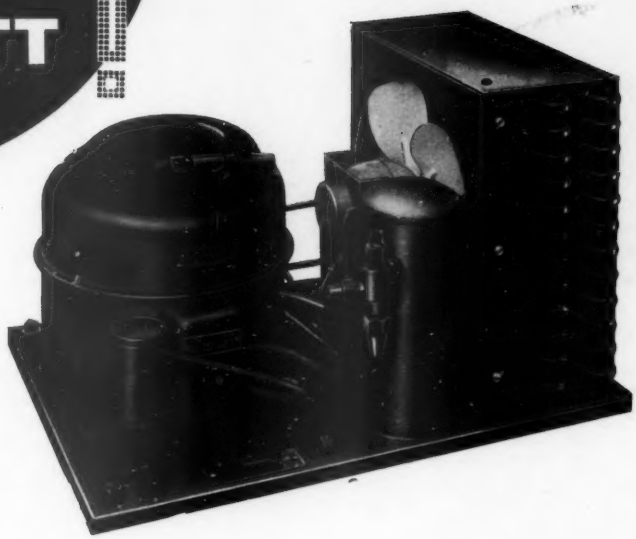

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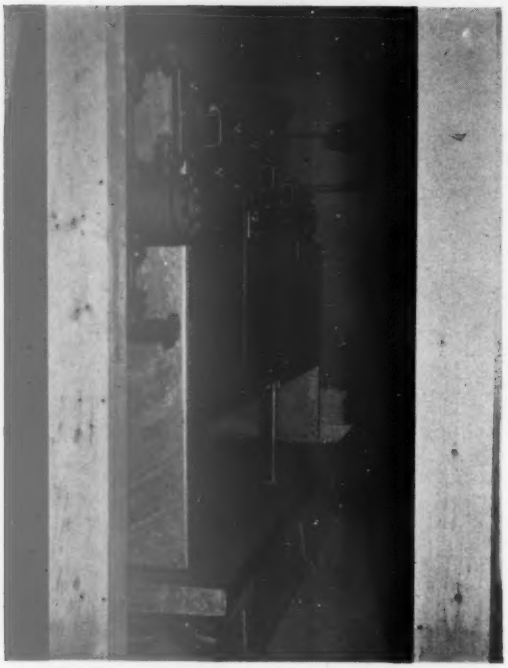


The evaporator room on the first floor.

in three huge insulated underground wells 100 ft. by 30 ft. by 26 ft. deep, and to-day one of those wells is still used for a buffer stock in the summer.

Over these wells has risen a new and most modern cold store for general sub zero storing or for higher temperatures, giving a total of 126,000 c.ft. on three floors. The construction is unique—a cold store on ice !

The site is actually a Thames-side dock which will be equipped to handle barge traffic. The construction of the store presented many problems due to the presence of the large underground ice-storage chambers necessitating very heavy sectional steel girders, etc. Their presence, however, obviated the necessity of a floor-heating mat as a protection against " frost-heave."

The store has been provided with a spacious loading bank leading directly to the lower chambers. The two upper chambers are served by a high-speed lift situated at the flank of the loading bank. Each of the upper chambers is fitted with removable floor hatches, which in cases of emergency can be utilized to lower goods to the ground floor by means of shoots.

The construction and insulation were carried out by a young and growing firm T. W. Weeks & Co. Ltd., whose managing director, Mr. Thos. H. Kent, has had several years' experience with refrigeration on land as well as at sea, and a complete envelope construction was devised. Mr. Kent visited the U.S.A. to study insulation methods.

The architects for the new structure were Messrs. Haynes and Carpenter, refrigeration plant by Sterne's, service lift by Maxim Conveyors and electrical work by Spicer's.

The chairman of the company decided to use polystyrene plastic insulation. " Jablite " is built in the ground floor, sandwiched between the roof of the ice wells, and is 6 in. thick. The wall insulation is the same thickness and goes up the walls to meet the roof insulation which is 8 in. thick, again built in the roof. The first and second floors also have insulation in the floors and only on the handling bay and in the air locks for the upper floor was " Jablite " bonded to the ceiling and plastered with " Flintkote." The wall insulation has been protected with $\frac{7}{8}$-in.-thick sand and cement rendering, suitably reinforced to give stability and lessen damage by trucks, etc. Another proprietary brand of plastic insulation, Isocolour, has also been used at certain points.

The vapour seal for the walls is Berry Wiggins' " Kingsnorth " 25 and their Aquaseal 1983 has been used as adhesive for general fixing.

The goods lift serves the first and second floors, the lower chamber being handled from the loading bay through two insulated doors, and all the doors were supplied by W. A. Taylor Ltd., of Mitcham.

An interesting feature of the air-cooling ducting, which is constructed of oil-tempered hardboard and metal " Right Angle," is that it is only three-sided, the sofit or roof of the chambers forming the fourth side. This method ensures full refrigeration of the roof panels and provides a useful reserve of refrigeration to cope with shock loads.

Opportunity in South Africa

F. & H. Technical Agencies, P.O. Box 9989, Johannesburg, have advised the United Kingdom trade commissioner at Johannesburg that they wish to obtain the agency of a United Kingdom manufacturer of refrigeration equipment for use in refrigerated trucks. The firm is interested in equipment which can be operated from a 6- or 12-volt battery or generator. F. & H. Technical Agencies were established in 1951 as indent agents specializing in agricultural machinery, industrial machinery, and the larger types of household appliances in addition to equipment for the catering trade. At present the firm represent four United Kingdom companies for commercial refrigerators, household refrigerators, milk coolers, electric motors and diesel engines. In addition, they represent an Australian firm for display counters and ice cream freezers, and a Canadian concern for glass fibre products.

The Temperature Field under the Foundation Plate of Artificial Ice Rinks

By E. EMBLIK

Knowledge of the temperature gradient under the foundation plate of artificial ice rinks is indispensable if damage due to the freezing ground below is to be prevented. Some account is given here of the methods used by Sulzer Brothers Ltd. for calculating the depth of frost penetration, and of the safety measures adopted in the construction of up-to-date artificial ice rinks embodying direct evaporation of the refrigerant.

As soon as the temperature of the foundation plate of an artificial ice rink falls below that of the soil, heat begins to flow upwards from the latter. A temperature field is thus created under the plate, and this field undergoes variations in time because the cold gradually penetrates to deeper and deeper layers of the soil. The rate of the drop in the soil temperature is determined by the coefficient of thermal conductivity of the soil, which in its turn depends on soil composition and moisture content.

After a certain lapse of time the soil is frozen to a depth which is fixed by the isotherm for 0° C. At the commencement of the cooling process, the frost limit is immediately below the plate, but gradually penetrates deeper. For the investigation of deformations due to the freezing of the soil it is important to know the level of the frost limit after the longest period for which the rink is likely to be in service.

The lines followed by the frost limit and by all other isotherms below a cooled foundation plate of finite size constitute an extremely complicated problem. Below the middle of the field, however, the isothermal boundaries may be regarded as approximately plane, horizontal surfaces, which is exactly what they would be if the plate were of infinite extent. On the other hand, as the isotherms here run at their deepest it is sufficient to consider the central section.

Let us assume that the concrete plate is kept at the constant temperature t_p, while at a great depth in the earth the temperature is also constant at t_e (fig. 1). The position of the isotherm for 0° C. is then given by the distance x_0 from the plate :—

$$x_0 = p\sqrt{z}$$

where z is the time in hours.* The proportionality factor p is obtained from the following equation :—

$$q_0 y_2 \frac{\sqrt{n}}{2} p = \sqrt{\lambda_1 c_1 y_1}\,(t_e - t_p)\,\frac{e - n_1^2 p^2}{G(n_1 p)} - \sqrt{\lambda_2 c_2 y_2}\,(t_e - t_s)\,\frac{c - n_2^2 p^2}{1 - G(n_2 p)}$$

where

$$G = \frac{2}{\sqrt{\pi}} \int_0^{np} e - n^2 p^2 \, d(np)$$

$$n = \frac{1}{2\sqrt{a}} = \frac{1}{2}\sqrt{\frac{cy}{\lambda}}$$

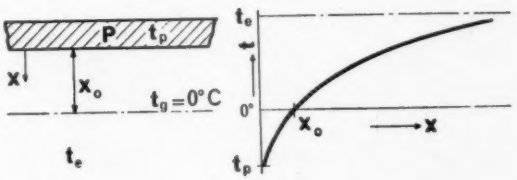


Fig. 1.—Temperature field in the soil below the foundation plate of an artificial ice rink.

P = plate
x_0 = distance of a given stratum of soil from the plate
t_e = temperature of soil
t_p = temperature of plate

t_s = freezing temperature of soil (about 0° C.)
q_0 = freezing heat of soil (kcal./kg.)
y = specific gravity of soil (kg./m.³)
λ = thermal conductivity of soil (kcal./m.hr. ° C.)
c = specific heat of soil (kcal./kg. ° C.)
a = thermal diffusivity of soil λ/cy (m.²/hr.)
Index 1 refers to the frozen part.

* See for instance Grober/Erk/Grigull, *Warmeubertragung*.

Index 2 to the unfrozen part of the soil.

The solution of the exact equation given above is an extremely time-consuming task. Calculation shows, however, that the error is very slight if mean values obtained from the figures for the frozen and unfrozen soil are used for y, λ and c. This represents a very considerable simplification, and after division by $(t_g - t_o)\sqrt{\lambda c y}$ we obtain :—

$$\frac{q_0 y \sqrt{\pi}}{2\sqrt{\lambda c y}(t_g - t_o)} p = \frac{e - n^2 p^2}{G(np)} - \frac{t_e - t_g}{t_g - t_p} \frac{e - n^2 p^2}{1 - G(np)}.$$

Now

$$\frac{y}{2\sqrt{\lambda c y}} = \frac{1}{2c}\sqrt{\frac{cy}{\lambda}} = \frac{n}{c}$$

and

$$q_0 = 80\frac{w}{100} = 0{\cdot}8\ w,$$

where

w = water content of soil in per cent. by weight. If we now introduce the following terms :—

$$\eta = \frac{t_o - t_g}{t_g - t_p} \text{ and } B = \frac{0{\cdot}8\ w\sqrt{\pi}}{c(t_g - t_o)}$$

Fig. 2.—Penetration of frost into the soil.

$x_o = p\sqrt{z}$

x_o = distance of the 0° C. isotherm from the cooled surface in m.

z = time in hours

$$B = \frac{1.42\ w}{c(t_g - t_p)} \qquad \eta = \frac{t_e - t_g}{t_g - t_p}$$

w = water content of soil in per cent. by weight

t_p = plate temperature in °C.

t_g = freezing temperature of soil ≃ 0°C.

t_e = temperature of soil at great depth in °C.

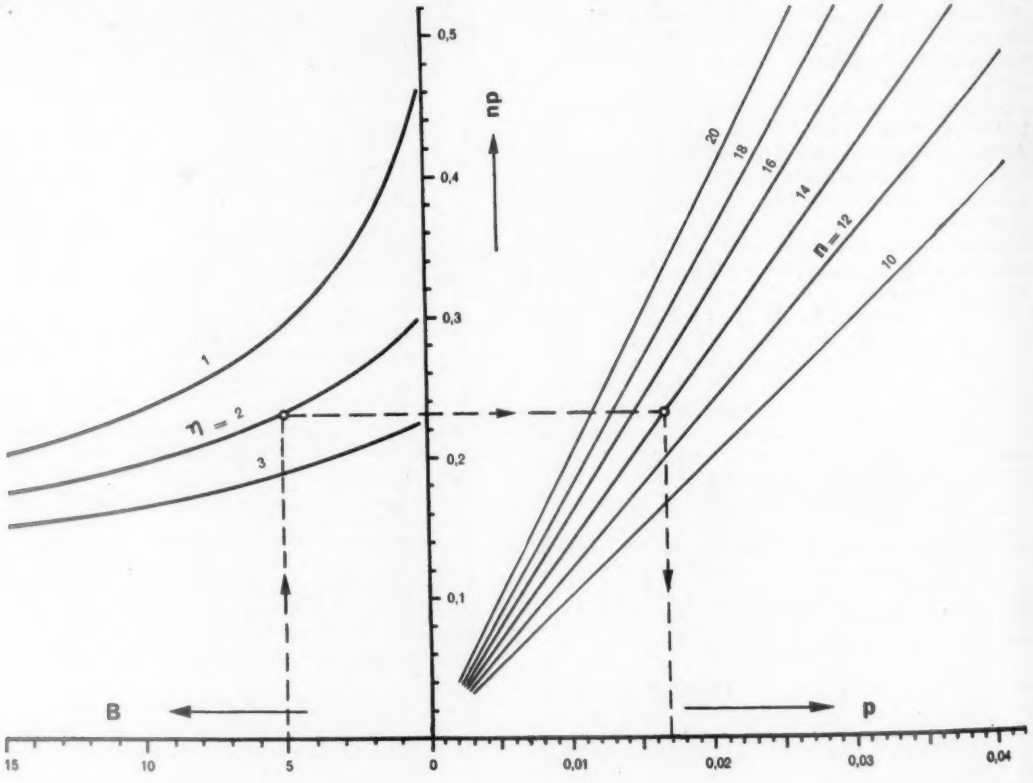
c = specific heat of soil in kcal./kg. °C.

$n = \frac{1}{2\sqrt{a}}$, where $a = \frac{\lambda}{c\gamma}$ = thermal diffusivity of soil in m.²/hr.

λ = thermal conductivity of soil in kcal./m.hr. °C.

γ = specific gravity of soil in kg./m.³

Mean values based on those for the frozen and unfrozen soil should be used for γ, λ and c.



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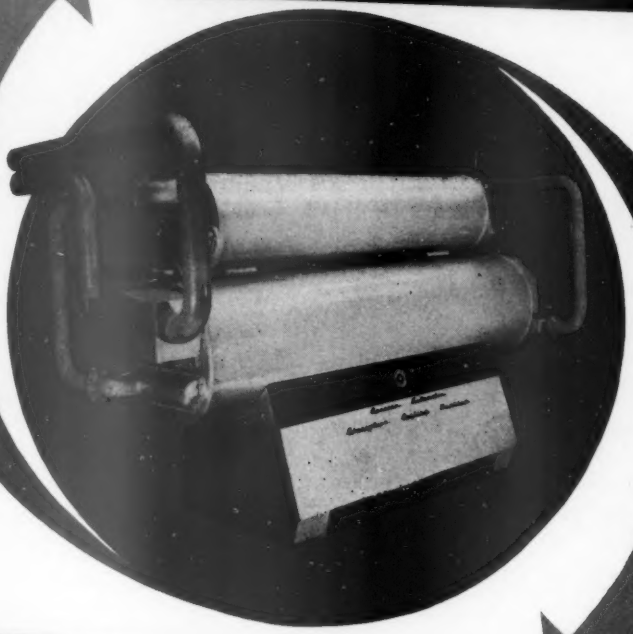

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we finally obtain

$$B\,n\,p = \left[\frac{1}{G(np)} - \frac{\eta}{1 - G(np)}\right] e - n^2p^2$$

The solution of this equation for p is shown in fig. 2. The parameters B, n and η are first calculated with the aid of the property figures for the soil, whereupon the desired coefficient p can be found by entering lines as in the example shown ($B = 5$, $\eta = 2$, $n = 14$, $p = 0{\cdot}017$).

Numerical indications of the thermal conductivity and specific heat of various types of soil at given water contents are very sparsely represented in the literature.*

If for a sandy soil with $w = 10$ per cent. water content by weight we assume values of $y_1 = y_2 = y = 1{,}500$ kg./m³, $\lambda 1 = 0{\cdot}76$ kcal./m.hr. ° C., $\lambda 2 = 0{\cdot}65$ kcal./m.hr. ° C., $c_1 = 019$ kcal./kg. ° C., $c_2 = 0{\cdot}23$ kcal./kg. ° C., we obtain at $t_p = -8°$ C. and $t_o = +12°$ C., and with the mean values $\lambda = 0{\cdot}705$ and $c = 0{\cdot}21$:—

$B = 8{\cdot}4 \qquad \eta = 1{\cdot}5 \qquad n = 10{\cdot}5.$

From fig. 2 we therefore have

$p = 0{\cdot}022$

and thus the depth of penetration of the zero isotherm :—

$x_0 = 0{\cdot}022\ \sqrt{z}.$

After a working period of 100 days, *i.e.* $z = 2{,}400$ hours, the frost limit in the middle of the plate would in this case have penetrated about 1·1 m. into the ground.

Clayey soil expands considerably when it freezes and would damage a concrete plate lying directly upon it. This danger is eliminated by removing the natural soil to a certain depth and replacing it by a layer of gravel entirely free from clay and marl and consequently unaffected by frost. This layer must extend so deep into the soil that the zero isotherm remains as far as possible within it.

* Landolt-Bornstein, 5th edition, supplementary volume III, p. 2392. M. V. Griffith, " The thermal properties of frozen soil," Bulletin 11F, 1955, Annexe 2, p. 147.

Fig. 4.—Laying the cooling pipes of Lagendorf ice rink.

Fig. 3 shows the site of the artificial open-air ice rink at Sion, in the Swiss Canton of the Valais, where the clayey and muddy soil, with its inadequate carrying power, was excavated and replaced by more suitable material. In this case the gravel was laid to a level somewhat higher than that of the original soil.

Frozen soil is a very effective cold accumulator. Even with a water content as low as 5 per cent. it can absorb about 7,000 kcal. per cu.m., and it thus cools the concrete plate at times when the refrigerating machine is switched off. If insulation is provided below the plate, the frost limit penetrates much less deeply into the soil. Consequently less cold is stored, but the refrigerating requirements for putting the rink into service are also lower. It is therefore worth while to insulate the foundation plate if it has to be unfrozen frequently to enable the rink to be put to other uses.

Fig. 3.—Excavation work on the site of the artificial ice rink at Sion.

While it was the custom until quite recently to provide an insulating layer below the plate for the purpose of mitigating as far as possible the upflow of heat from the soil, the considerations set forth above now lead in most cases to the omission of an insulating layer proper.

The foundation plate is cooled by pumping either cold brine or an evaporating refrigerant through the pipes embedded in it.

Fig. 5.—Viege ice rink shortly after completion.

The use of brine always entails increased corrosion, so that in recent times the trend has been towards cooling by the use of an evaporating refrigerant. Fig. 4 shows the laying of the cooling pipes for direct ammonia evaporation in the Langendorf Ice Rink, Switzerland. Fig. 5 is a picture taken just after the completion of the artificial ice rink at Viège, in the Valais, which also operates with direct ammonia evaporation. At another Swiss ice rink, that at Sion, the machine room of which is illustrated in fig. 6, also operates with the direct evaporation of ammonia in the cooling pipes.

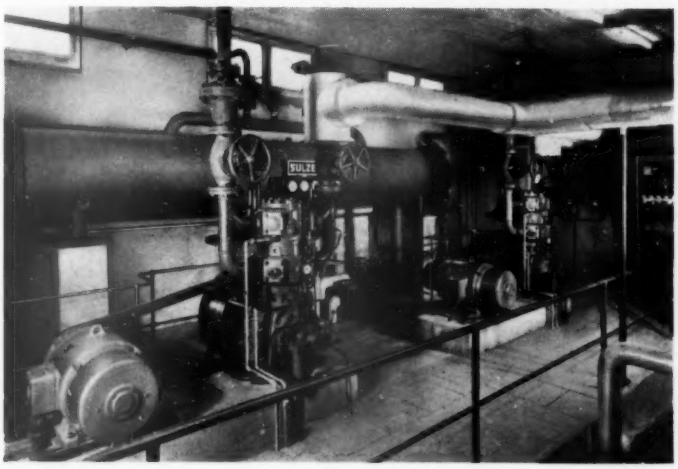

Fig. 6.—Machine room with Sulzer compressors at Sion ice rink.

We are indebted to Sulzer Brothers, Winterthur, Switzerland, for the text and illustrations reproduced in this article.

The Institute of Refrigeration Bulletin

Institute Headquarters: New Bridge Street House, New Bridge St., London, E.C.4 (CENtral 4694)

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LIGHTFOOT MEDAL

On the recommendation of the papers committee, the executive council has decided to award the Lightfoot medal for the best paper of the 1957-8 session to Dr. G. G. Haselden, B.SC. and Dr. L. Klimek, DIPL.ING., for their paper entitled " An experimental study of the use of mixed refrigerants for non-isothermal refrigeration," which they presented at the meeting of the Institute held on April 1, 1958.

EVENING CLASSES IN REFRIGERATION 1958-9

Evening classes in refrigeration will shortly be commencing at technical colleges in various parts of the country. These classes cover two distinct courses of study. One of the courses, that for the City and Guilds of London Institute syllabus no. 73, in the science and technology of refrigeration, is intended for the student who wishes to obtain a professional qualification and to qualify for corporate membership of the Institute ; certain pre-entry qualifications are required by persons enrolling for this course. The other course, for the City and Guilds syllabus no. 72, in refrigeration practice, is primarily designed for students who desire to become qualified as refrigeration servicemen.

The Science and Technology of Refrigeration

Evening classes in the science and technology of refrigeration will commence at the National College for Heating, Ventilating, Refrigeration and Fan Engineering, Borough Polytechnic, Borough Road, London, S.E.1, towards the end of September. The course, which extends for two years, is in preparation for the City and Guilds of London Institute syllabus no. 73, which is the examination for corporate membership of the Institute of Refrigeration. Intending students must be over 21 years of age and should hold the Ordinary National Certificate in Mechanical Engineering (including Applied Heat or Heat and Heat Engines) or an equivalent qualification.

Enrolment

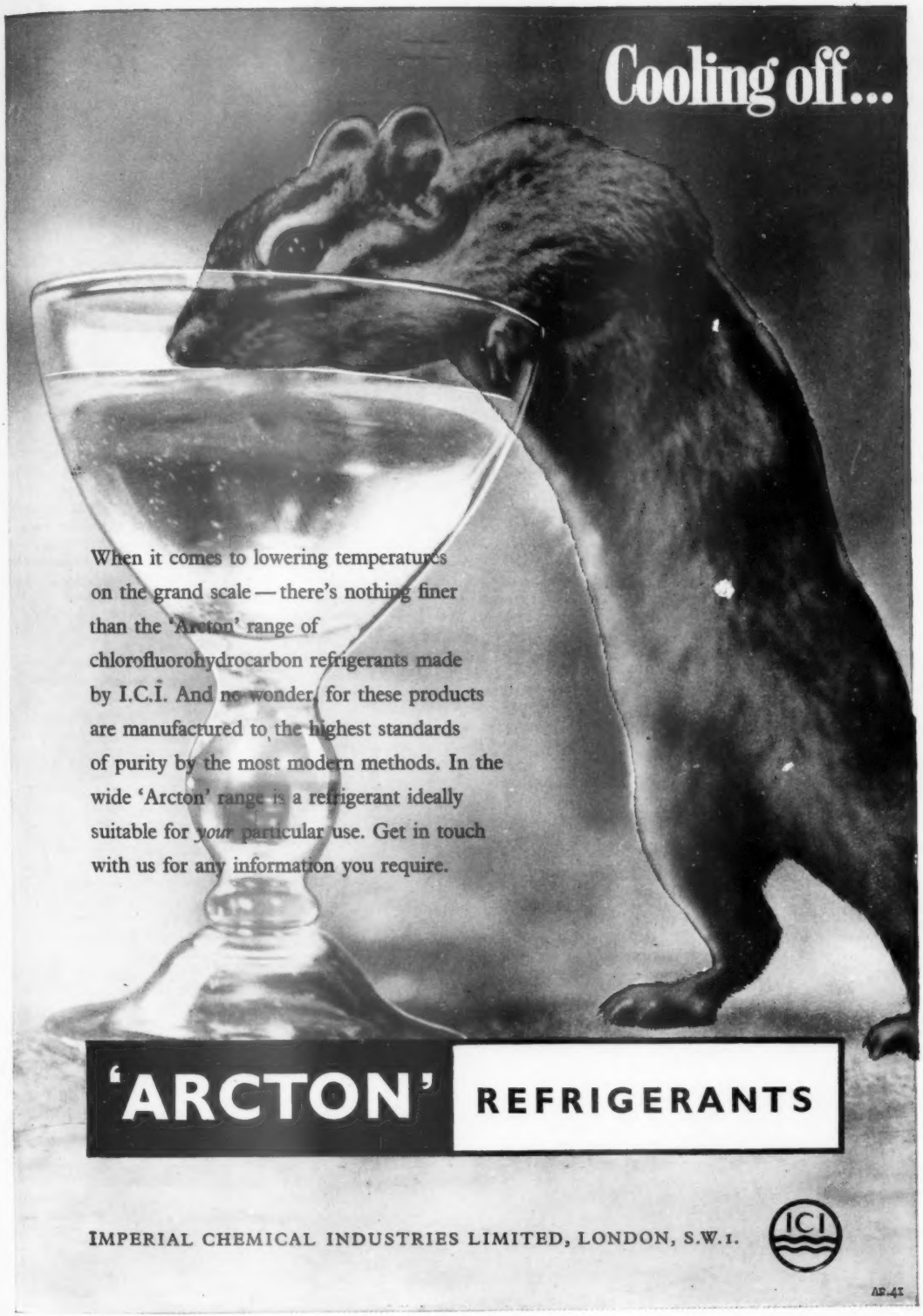
The college will be open from 5.30 p.m. to 8 p.m. on the evenings of September 15, 16, and 17 for the enrolment of students for part-time day and evening courses. The director and members of the staff will be present on each evening to advise students on suitable courses of instruction. The fee for students residing within the administrative County of London and most of the adjoining counties is £2 10s. for an evening course consisting of two or three evenings a week. In some cases, students who reside outside the administrative County of London will be required to furnish vouchers from their local education authority. Particulars may be obtained on application to the secretary of the college. The governors require all part-time students to pay a fee of 1s. 6d. a year for membership of the Borough Polytechnic.

Refrigeration Practice

It is believed that courses in refrigeration practice, in preparation for the City and Guilds of London Institute syllabus no. 72, are to be held at the following colleges :—

Stretford Technical College.
Stowe College, Glasgow.
Preston Technical Institute, Brighton.
Willesden Technical College, Mid dlesex.
Hastings Technical College.
Reading Technical College.
Llandaff Technical College.

Enquiries concerning these courses should be made to the principals of the Colleges.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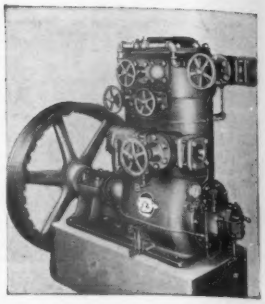
COMMERCIAL AND INDUSTRIAL SECTION

Manufacturers' and distributors' news



After nine years' service with the British Thermostat Company and its subsidiaries, **Mr. Harold H. Egginton** has resigned from the post of works manager with Teddington Refrigeration Controls Ltd. to take up the appointment of deputy general manager, British Ropes Ltd., Doncaster Wire Mills.

* * *

Mr. Leonard Royle has been appointed a director of **J. Samuel White & Co. Ltd.** in addition to his present appointment as manager of the aircraft and refrigeration division. It was in November 1936 that Mr. Royle joined the company and since 1938 has been managing its Somerton works. A native of Bolton, he received his technical education at the Moseley Technical School concurrently serving an engineering apprenticeship with John Musgrave & Sons Ltd. Later he gained much experience in production engineering with firms in the Lancashire area before he came south to join J. Samuel White & Co. Ltd.

* * *

Armco Ltd. have now removed to 76, Grosvenor Street, London, W.1. The telephone numbers, telegraphic and cable addresses remain as hitherto: Hyde Park 9711, 6 lines ; " Armcoingot, Wesdo, London" ; "Armco, London."

* * *

" Dulux " acrylic stoving enamel F 664-line—a new one-coat paint finish for domestic equipment—has been introduced by **I.C.I. Paints Division.** This new material, whose properties are due largely to the new acrylic resins on which it is based, is particularly suitable for refrigerators, washing machines and other metal equipment used in kitchens and bathrooms and has a number of advantages over the usual two-coat system of primer and finish. Its resistance to yellowing and staining in kitchens is better and it has higher gloss and build. In appearance and other properties " Dulux " acrylic stoving enamel is mid-way between vitreous enamel and an ordinary paint finish. There are undoubtedly applications where it can be considered as an alternative to vitreous enamel and satisfactory tests have already been carried out on washing machine tops. With an ordinary paint finish the painting process consists of a coat of primer and a coat of finish. With this new I.C.I. product no primer coat is normally necessary and a stoving operation is thus saved. In a one-coat system with a film thickness of about 1¾ thou. it will give a superior performance to that of any established two-coat system. " Dulux " F 664-line can be used on steel, electrolytically zinc-coated steel and aluminium, each of which must be suitably pretreated. A chemically clean and corrosion-free surface is essential before painting. Dipping or stoving primers can be supplied where necessary for covering surface imperfections.

* * *

Laminations in sheet metals caused by the presence of defects such as piping, blow-holes or segregation in the ingots from which the sheet is rolled, are a potential source of danger particularly during deep drawing and pressing operations. These flaws become flattened and elongated during the rolling process and result in internal discontinuities measuring anything from a fraction of an inch to several inches in width running parallel to the surface of the sheet. They are usually invisible on the surface and can cause the sheet to burst in the press and damage dies and tools, thus disrupting production. In order to provide a simple method for the examination of cold rolled sheet steel for such flaws, the British Iron and Steel Research Association (**BISRA**) has developed a lamination detector. The principle of operation of this device is by the application of a small electric current through the sheet, the potential difference being measured with a millivoltmeter. The presence of any discontinuity in the path of the current causes the latter to flow round the obstacle instead of in a direct path between the two contact points and the resulting change in potential is registered on the millivoltmeter.

* * *

Ambersil formula one, the aerosol-packed silicone spray lubricant, is now being used successfully by a large ice cream manufacturer for spraying all moving parts of wrapping machines which come into contact with waxed cartons. The lubricant is sprayed on these parts by hand at regular intervals, and acts to prevent wax build-up. It has been found particularly valuable in preventing build-up on plungers. Ambersil formula one is odourless, tasteless, colourless and non-toxic. It is therefore highly suitable for use on wrapping and packing machinery coming into contact with food. Ambersil is manufactured for industry by **Amber Oils Ltd.**, of 11A, Albemarle Street, London, W.1, a member of the Amber group of companies, with Amber Chemical Industries Ltd., The Amber Chemical Co. Ltd., Charles H. Windschuegl Ltd. and Causeway Reinforcement Ltd.

* * *

The bulkhead seal was developed by **Crane Packing Ltd.**, of Slough, for use on drive shafts passing through bulkheads or explosion walls. It is able to withstand the type of bulkhead movement encountered in marine applications, and can also accommodate a considerable

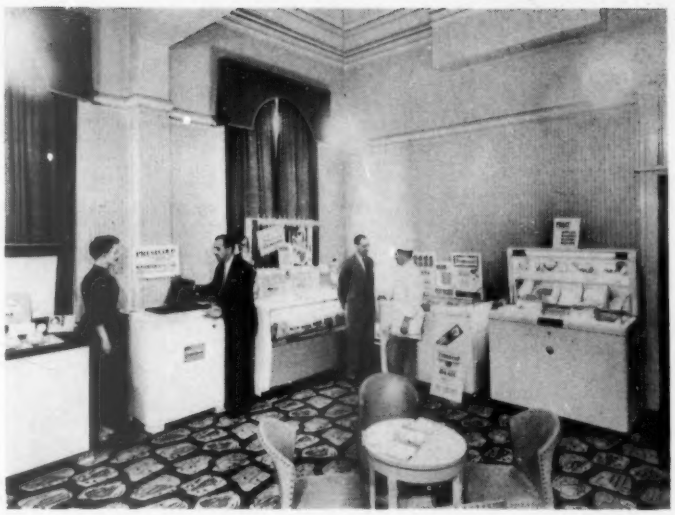
degree of malalignment. The design of the bulkhead seal is such that even an explosion would not open both seal faces, and its construction is robust. A special material is used for the seal faces which are capable of dry running at low speeds ; this also forms the sealing lips in contact with the sleeve. The seal is suitable for completely dry running on light duties, for example, face rubbing speeds up to 500 surface feet per minute, provided that the maximum air pressure between the seals is 10 p.s.i. and the operating temperature is below 30° C. At higher rubbing speeds, pressures or operating temperatures, the combined effect of these factors upon the seal may make liquid cooling necessary, and it should then be run in conjunction with a small oil reservoir. The maximum pressure which this seal is capable of retaining is 30 p.s.i. where service conditions are in other respects favourable. The bulkhead seal is made in a range of shaft sizes from 1¼ to 6 in. Among other light duty sealing applications for which it is suitable are low-pressure fans.

* * *

A new, high-speed, 3-in. Metrovac diffusion pump has been developed by **Metropolitan-Vickers Electrical Co.** for use in laboratory and small industrial vacuum applications such as electron microscopy, mass spectrometry, etc., where working pressures in the range of 1×10^{-3} to 1×10^{-6} mm. Hg are required. The pump body is a water jacketed cylinder of non-corrodible copper alloy enclosing an aluminium three-stage jet system. A readily detachable heating unit comprising a metal-sheathed radiant element, effectively lagged in a polished aluminium cover, is fitted to the base of the pump. The pump body has a stove enamel silver grey hammer finish.

* * *

Of considerable interest to the hotel and catering trades was a display of frozen foods held in the Clifton Hotel, Blackpool, by Fylde Frozen Foods Ltd. recently. A wide range of products for the catering trade was on show, including vegetables, fruits, meats, fish, sea food, etc., and many existing and prospective users were made welcome on the two days that the display was open. The refrigeration equipment used was supplied by Prestcold distributors, **Refrigeration Nor-West Ltd.,** and included the Prestcold farm freezer in addition to a considerable amount of display equipment, as of which combined to make the display very attractive.



A view of Fylde Frozen Foods Limited Display at the Clifton Hotel, Blackpool.

* * *

Now in production by **G.V.E. Ltd.** is this new refrigerated shelf (below) for bottle cooling which is completely self-contained. The shelf, which is 4 ft. long, only needs to be plugged in and because the refrigerating unit is attached to the shelf, installation is easy. Economy is effected since no structual alterations to premises are needed and also because there is no loss of efficiency due to the refrigerating unit being remote from the shelf itself. Profitable advantage of the G.V.E. shelf being self-contained is that it can be easily moved from the bar to another room and can be transported for use at outside functions, thus providing cool drinks at point of sale. The unit cover has been specially designed to display half-pint bottles and can be sign painted for added sales promotion ; the shelf itself is fitted with a Perspex flap on spring hinges to increase the efficiency of cooling and to ensure visability of bottles.

This was the shape of o

of oil after radiation

Here was a problem of national importance. Lubricants were needed by the nuclear industry for reactor equipment, much of it subjected to radiation. Yet, like human beings, oils and greases were vulnerable to radiation. Oils darkened in colour and became coarse-grained solids (solidification being but one of a tangled skein of problems).

The Shell Group started working on the problems of lubricating under radiation conditions while most nuclear power stations were still on the drawing board. In fact, Shell was the first oil company to develop Atomic Power Lubricants, and the research that went into Shell A.P.L. is characteristic of the way Shell sets about doing things. A team of research workers was assembled at Shell's Research Centre at Thornton. Series of tests were carried out both in the B.E.P.O. pile at the U.K. Atomic Energy Authority Research Establishment, Harwell, and with Thornton's own Cobalt 60 source of radiation. In 1957, after four years of research, Britain's first range of Atomic Power Lubricants was on the market.

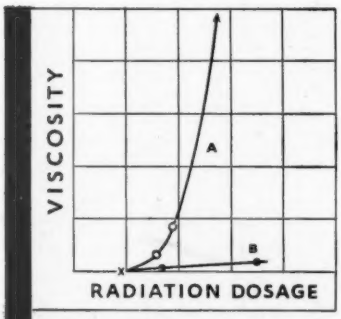
The moral of the A.P.L. story is that Shell research is supremely applicational. The Centre at Thornton is always ready to work with even the most specialised sectors of industry to produce the right oil for the job. If you and your organisation have any major lubrication problems, it will pay you to get in touch with your local distributor of Shell Industrial Lubricants.

The Research Story

In the hundreds of complex hydrocarbons examined, very different reactions to radiation were observed according to the configuration of the atoms in the molecules. When carbon atoms were arranged in long, straight chains, radiation caused these chains to link up with one another, giving highly complex structures of an entirely different nature from the original material. The first effect of this change was to cause a rapid increase in viscosity, ultimately giving rise to a solid rubber-like product.

For example, a high quality turbine oil conforming to BSS.489 receiving a dosage of 1.77×10^{18} neutrons/cm^2 was changed into an intractable solid—a clear demonstration that radically new lubricants were needed by the nuclear industry.

Shell Atomic Power Lubricants have a molecular structure that has proved itself very resistant to radiation. In fact it will withstand a radiation dosage four million times stronger than that which will kill a man—without any significant change in structure or physical properties.



Relationship between radiation dosage and percentage increase in viscosity, cS at 100°F.
Oil A: high molecular weight long chain hydrocarbon. *Oil B:* Shell A.P.L. 731.

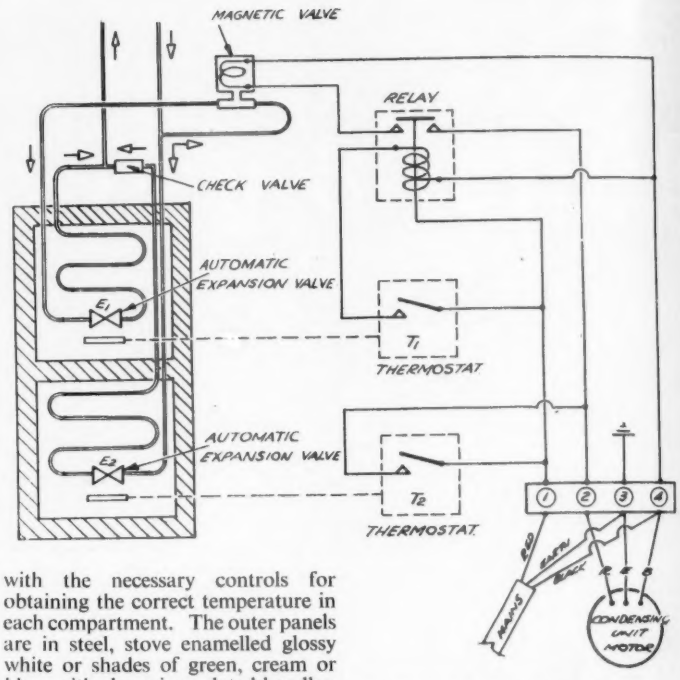
SHELL

ATOMIC POWER LUBRICANTS

another proof of Shell leadership in Lubrication

New Two-Temperature Cabinet

Of considerable interest to the retail food trades and other users is the latest version of the Aero Phreze Frosfood dual temperature refrigerated cabinet, made by **Aero Pipe & Glass Co. Ltd.** This cabinet has been designed to meet the need of farmers, hotel keepers, restaurants, grocers and provision merchants, dairies and many other users who require a refrigerated cabinet covering a small floor area and which can store both frozen food and ordinary provisions at the appropriate temperatures. It is extremely attractive in appearance and covers only 2 ft. 6 in. by 2 ft. 5 in. floor space. The bottom half provides 6·7 c.ft. of storage space for frozen food and ice cream on refrigerated shelves at a temperature of 0° F. and the top half has a capacity of 10 c.ft. for the storage of provisions at a temperature of 40° F. Temperatures in the two compartments are individually adjustable by separate thermostats. The cabinet is supplied complete



with the necessary controls for obtaining the correct temperature in each compartment. The outer panels are in steel, stove enamelled glossy white or shades of green, cream or blue, with chromium-plated handles, locks and hinges. The insulation of the deep freeze compartment consists of 4 in. of glass wool and that of the provision storage compartment of 2 in. of glass wool. Considerable ingenuity has been applied to the development of this cabinet which requires a low-temperature compressor unit extracting heat at the rate of 1,280 B.t.u. per hour at –9° F. suction temperature and 1,040 B.t.u. per hour at –17° F. suction temperature.

From the circuit diagram it is clear that as long as the chiller section requires cooling the automatic expansion valve operates and holds the suction pressure at about 9 p.s.i.g. The extraction rate of the compressor and the size of the chiller evaporator are such that the required temperature is reached in a short time. When this temperature has been reached the chiller thermostat T_1 (via a relay) shuts the magnetic valve, supplying refrigerant to the chiller, and would switch off the compressor unit, if the thermostat controlling the temperature of the deep-freeze section did not keep it going. The suction pressure is now reduced to approximately 2 p.s.i.g. by the automatic expansion valve E_2 and the deep-freeze compartment is cooled to 0° F. or below before the thermostat T_2 finally switches the compressor off. A check valve ensures that, while the unit is working for the chiller, no refrigerant can find its way back to the evaporator of the deep-freeze compartment.

A series of tests were made with 47 lb. of goods in the chiller and 42 lb. in the freezer, and recording thermometer measuring the air temperature in the centre of each section. The ambient temperature throughout the test was 75° F. In the first test, doors of both sections kept closed during the entire test and the following figures were obtained :—

	Chiller	*Freezer*
Average running time per cycle ...	225 sec.	1,380 sec.
Average "off" time per cycle ...	1,800 sec.	3,380 sec.
Percentage of running time to time of one cycle ...	11·1 per cent.	26·3 per cent.

Maximum temperature	38·5° F.	0° F.
Minimum temperature	37·5° F.	–4·5° F.

In another test, both doors were opened 15 sec. every 30 min., but times of opening were staggered 15 min. :—

	Chiller	*Freezer*
Average running time per cycle ...	210 sec.	2,160 sec.
Average "off" time per cycle ...	1,492 sec.	3,410 sec.
Percentage of running time to time of one cycle ...	12.35 per cent.	38·8 per cent.
Maximum temperature	41° F.	+1·5° F.
Minimum temperature	38° F.	– 5° F.

Another popular model made by Aero Pipe, the " Eezi-Serve," is an open-top display counter, which will be described next month.

* * *

Minikay Ltd. has now produced another well-known Miniveil air curtain unit to suit site conditions where there is extremely limited headroom over the doorway. In the past, many would-be users of Miniveils have been prevented from adopting these units owing to lack of space over their cold-room doors. A Miniveil can now be designed to fit into as little as 9 in. of headroom and yet still give the remarkably high degree of protection that has come to be expected of it. The adoption of Miniveil air curtains enables operators of cold rooms to leave their doors open for prolonged periods, in order to load or unload, without serious rise in temperature within the cold room. Another important advantage is that airlocks are no longer necessary. For the first time, therefore, cold store operators can enjoy completely unimpeded doorways. This, coupled with the fact that the Miniveil is fixed above the door and is now manufactured in an aluminium alloy, means that maintenance troubles are virtually eliminated.

* * *

The Allied Chemical Corporation in the United States has recently developed an entirely new type of snap-on thermal insulation that has a low k factor, excellent resistance to physical damage, and unusual resistance to chemicals and solvents. Based on the company's material, called Nacconate diisocyanates, the insulation is designed for service between –200° and +250° F. It is ideal for all refrigeration work and low-pressure (5 p.s.i.g.) steam lines. Urethane insulation does not fray, crumble, or break in handling ; neither does it disintegrate when subjected to water or many other liquids. On drying, the insulation is as good as new. Another important feature is that the insulation is preformed to fit pipelines and fittings. Its outside diameter is such that it will nest correctly with a second layer, in case heavier thicknesses of insulation are desired. The dual-layer procedure also permits staggering of joints to reduce heat loss to a minimum.

* * *

After a fine career in the refrigerating industry lasting 31 years —during which time he made innumerable friends, **Mr. James F. Elliot** has retired from L. Sterne & Co. Ltd. Entering the engineering world as an apprentice on the civil side, after leaving Paisley Grammar School, he began with Kyle, Dennison & Laing, at the same time studying at the Glasgow Royal Technical College. After five years' service in world war I, he was engaged on civil engineering contracts in Scotland and the

Gold Coast, West Africa until 1926 when he became interested in refrigeration. He joined the original staff of Frigidaire when they opened up a branch in Glasgow in 1927. In 1928 he went to L. Sterne & Co. Ltd. in London where he remained as a technical representative on ammonia work till 1951 when he became sales manager of the Sternette Division for London and the southern area, a position he continued to hold until last month.

REFRIGERATION CONTROLS (*continued from page 794*)

considered from the characteristics of the pilot, and the servo valve troubles will in the main be under size or oversize, hysteresis or sticking through dirt, unless the pilot is under size or oversize.

NEW ADMINISTRATION BLOCK FOR LEC REFRIGERATION

★

This recent air view of the five-acre site of the Lec Refrigeration factory at Bognor Regis reveals many developments, including the new administration block, which has "Wallspan" walls by Williams & Williams, London. "Wallspan" consists of a grid formed by vertical and horizontal aluminium members which is bolted to the frame of a building. The spaces between the members are filled by windows, doors, or various kinds of panelling. The result is a complete and permanent wall. In this building, the spaces are filled by aluminium windows and Roften yellow panels. The resultant wall—little more than 2 in. thick—has the same insulation value of an 11-in. cavity wall. This difference in thickness adds up to a valuable gain in floor space.

The showroom, at bottom left, is very gay in its colour treatment, and now forms the main entrance to the building. At right is the managing director's office.

SHOP REFRIGERATION NEWS

The Individual Grocer

By Our Special Retail Correspondent

(*Continued from July issue*)

THE last illustration in the first part of this article on the individual grocer's shop showed one of the cabinets in the premises of Mr. W. R. Hull at Hall Green in the Birmingham district. Not converted to self-service, it is an example of the popular over-the-counter type of grocery business, and is equipped with two cabinets from which customers can make their own selection. A deep, narrow shop, it has one cabinet, a Smithfreeze set at right angles to the wall and facing the door, at about half-way depth of the shop, with a display of showcards advertising Sea Sparkle and Westwick products built up almost to ceiling height. The other cabinet is near the door.

Some cabinet suppliers contend that a doorway position is bad because of the risk of draughts disturbing the ambient temperature ; but it does not necessarily follow that there always is a draught at the entrance. One example of successful operation of a cabinet almost overlapping the threshold without any disadvantages from draught is provided by the York Shipley cabinet, overleaf, in the doorway of Mr. F. G. Gale, of 17, West Road, Westcliff-on-Sea.

Last month I gave an example of how newcomers to the grocery trade are helped in the acquisition of merchandise and equipment (which, in some instances, includes refrigerated cabinets) by joining one or another of the voluntary buying groups formed by a large number of wholesale distributors. These newly established grocers are not saying, as so many have been prone to say in the past, " I will wait for a year or two, before I go in for refrigeration : until I see how things go." Rather, they are being encouraged to take the attitude that things will go right, from the start, if they start right, *with* refrigeration.

Many of them have, as in the example described and illustrated, started in the way they intend to go on, by accepting refrigerated display as an essential part of the set-up of a modern food shop, whether it operates on self-service or sells over the counter.

Apropos counters, I will risk being considered

reactionary by expressing the view that it is important for those refrigerator salesmen who are concerned with the sale of cabinets to retailers to realize that, notwithstanding the comparatively rapid development of self-service and the encouragement (persuasive pressure is perhaps a more appropriate term) that grocers receive at the various self-service exhibitions organized jointly by shopfitters, cash-register makers, and the suppliers of refrigerated cabinets, it does not necessarily follow that self-service is the right method for every grocer.

Successful operation of a cabinet placed practically in the doorway of a grocer's shop is reported from Westcliff-on-Sea.

I think there is a certain amount of risk in so closely and invariably associating refrigerated display with self-service that many of the successful, old-established grocery businesses, who tend to be die-hard as far as refrigerated display is concerned, or to make the minimum use of it, may be made more resistant.

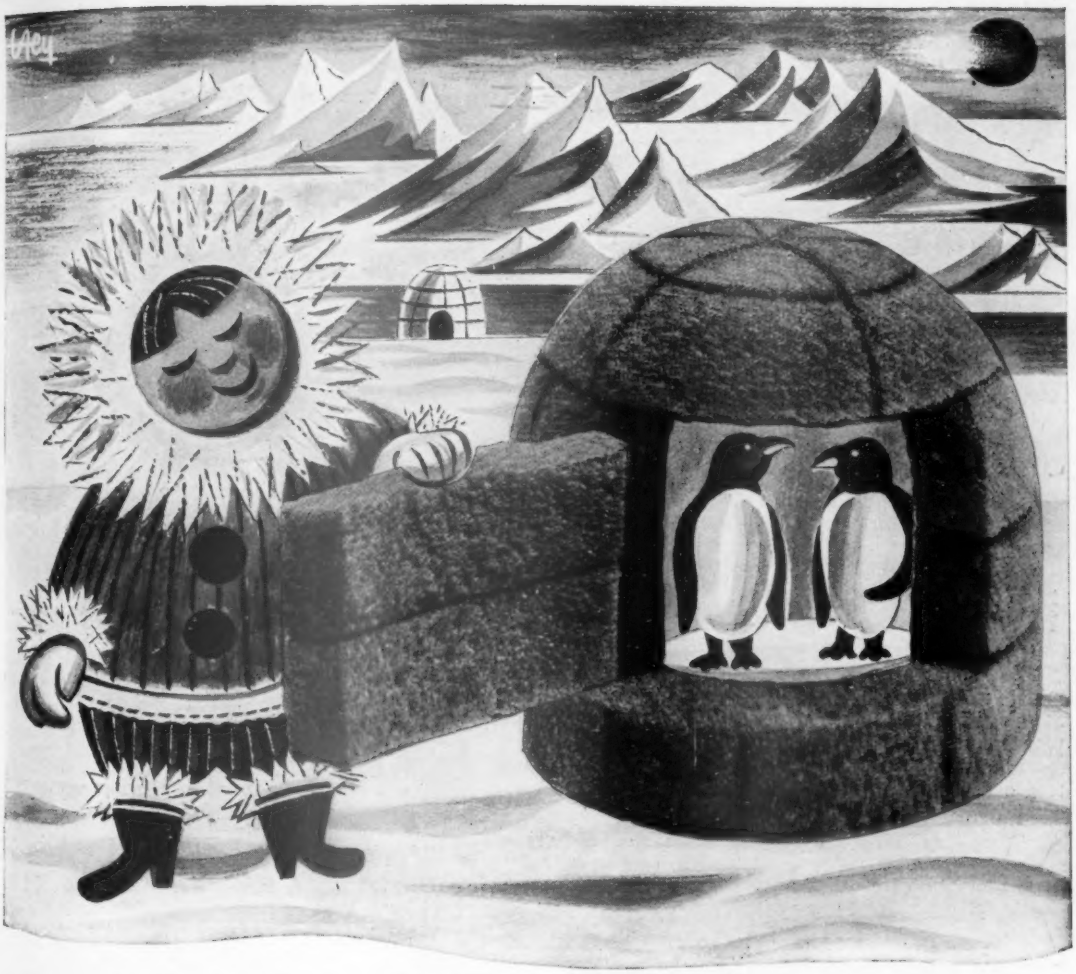
The right approach to such people, who pride themselves on their close personal touch with the thousands of customers who still prefer to buy (and chat) over the counter, is, I suggest, " You don't have to convert to self-service in order to be up to date. We have a good selection of cabinets for the counter-equipped shop, or you can have one designed to meet your needs."

Notwithstanding the many changes being brought about, I can visualize many such businesses that still are the backbone of the grocery trade. One example, which I have visited quite recently, is the shop of Austin Hopkinson & Co., Ltd., known as The County Stores, in Market Head, Derby. This business was established in 1790 and (to quote from *The Grocers' Gazette*) " judging by the way in which it interweaves pride of tradition with the *modern* application of family-grocer principles, it has nothing to fear from supermarkets or giant multiples."

Mr. J. D. Poyser, a director of the firm, told me that Austin Hopkinson were one of the first retailers to sell quick-frozen foods in this country.

ONE-COMMODITY CABINET

This shop in Scotland sells nothing but dressed chickens from its refrigerated cabinet.



new insulation, light and strong

These simple-to-mix components give rigid foams to provide the refrigeration industry with a remarkable new insulating material that combines high thermal resistance with strength and lightness. Easily mixed on the site, the components produce the foam in the cavity to be filled. Foams of varying density can easily be made.

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Ask for details of **Daltolacs 21 & 22** and **Suprasec D**

Enquiries should be addressed to:
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IMPERIAL CHEMICAL INDUSTRIES LIMITED LONDON SW1 ENGLAND

SCOTTISH REFRIGERATION SHOW

The Sternette Spring Show of 1958 was held in mid-May in the Music Hall, Aberdeen, where L. Sterne & Co. Ltd., are believed to have been the pioneers of refrigeration exhibitions. The deep freeze and short-term storage cabinets and counters, etc., were stocked with a most attractive and comprehensive display of foodstuffs by some of Sterne's customers; the leading frozen food manufacturers were also well represented. The centre-piece of the show was the "Carousel" a special refrigerated rotary display by Craig-Nicol. A picture showing part of the exhibition appears above.

AN INTERESTING PROMOTIONAL PLAN

A UNIQUE development affecting the hygienic services of sausages and meat products in shops throughout Britain has been announced by T. Wall and Sons (Meat Products) Ltd. of London, Manchester and Hayes.

In conjunction with Frigidaire and Prestcold Refrigeration, Wall's have produced spacious refrigerated counter-display units costing little over £100.

Mr. J. H. Penny, Wall's marketing director, said that many retailers, previously unable to afford such equipment, could now buy counter refrigeration for the first time and that details of the offer are being sent to some 23,000 retailers.

He added that the companies had co-operated in designing the units which would be available to grocers in July at probably the lowest price ever achieved for counter refrigeration equipment—£109 10s. for the Frigidaire unit and £116 15s. for the Prestcold cabinet. The Prestcold cabinet has a built-in compressor unit and the Frigidaire compressor is compactly fitted under the counter. Both types, he emphasized, could readily be housed on existing counters without expensive structural alterations, and both will be equipped by Wall's with a merchandiser unit.

"Wall's will give £5 5s. wholesale worth of meat products to every retailer who buys a cabinet," said Mr. Penny. "Each purchaser will receive a book of vouchers entitling him to 15s. worth of meat products at seven fortnightly intervals."

Australian Institute of Refrigeration's Conference and First Australian Refrigeration Exhibition

(specially contributed)

THESE functions were promoted and organized by Industrial Public Relations Service (N.S.W.) Pty. Ltd., under the sponsorship of the N.S.W. division of the A.I.R., and were held at the R.A.S. Showgrounds, Sydney, from May 5 to 10, 1958.

The I.P.R. were responsible for the presence of two notable overseas gentlemen to lecture at the convention, namely, Professor Doctor Rudolf Plank, professor of the Institute of Technology, Karlsruhe, Germany and a leading world authority on food preservation and official adviser on this subject to South Africa, Egypt, China, Japan and U.S.A. and Mr. George F. Taubeneck, chairman-publisher and editor of *Refrigeration and Air-Conditioning News*, Detroit, Michigan, U.S.A. During the week of the convention there were eight separate sessions of lectures.

Quite a large number of delegates left Melbourne on May 3, travelling by the Daylight Express which provided a very restful trip and were met at Sydney by a reception committee headed by Mr. S. Hort and his officers. Some Queensland delegates had arrived earlier. The next day, Sunday, delegates were arriving all day, either by car, air or train, and the large block of rooms of the N.S.W. division were all taken up. Sunday night was occupied by meeting old friends.

On Monday at 11 a.m. the New South Wales division of the A.I.R. gave a reception at the Hampton Court Hotel to delegates and visitors with their ladies, and it was very pleasing to note that there were quite a number of members of the Institute of Refrigeration Service Engineers present coming from other States, even as far away as West Australia and North Queensland. It was also particularly pleasing to note that there were several members of the New Zealand Institute of Refrigerating Engineers including Mr. Harkness and Mr. McAlpine. This function was carried through with the usual homely swing and fellowship associated with A.I.R. receptions and before the close everyone was acquainted.

The afternoon was left free but the A.I.R. councillors held a council meeting. Very sad news was given to the meeting, namely, that Mr. R. R. Sinclair, managing director, J. Wildridge & Sinclair Pty. Ltd., had died suddenly on the previous Friday afternoon. Several councillors left the meeting early to attend and represent the A.I.R. at his funeral. Mr. Sinclair was programmed to give a lecture entitled "Recent Australian developments in the rapid freezing of meat" on the Tuesday evening.

At 6.15 p.m. on Monday, an informal gathering as a preliminary to the conference dinner was held at Cahill's Restaurant, Elizabeth Street; just over 250 delegates and their ladies and visitors were present. Mr. Sam Hort, President of the N.S.W. division, was the host and the "V.I.Ps" were Professor Plank, Mrs. Plank and Mr. George Taubeneck.

On Tuesday at 10.30 a.m. the Hon. J. J. Maloney, Minister for Labour and Industry, officially opened the exhibition at the Royal Agricultural Showground.

The following papers were presented at the convention sessions :—

First Day

Convention session C1. Chairman : Mr. S. Hort, president, N.S.W. Division, A.I.R.

"Techniques and ethics of selling in refrigeration and air-conditioning" by Mr. G. F. Taubeneck.

"Refrigeration in Australia" by Sir Edward Hallstrom.

Convention session T1. Chairman : Professor J. P. Baxter, O.B.E., vice-chancellor, N.S.W. University of Technology.

"Lesser-known production methods and applications of refrigeration" by Professor R. Plank. (The influence of new refrigerants on the development of the refrigeration industry. New cold air machines. Absorption refrigeration. Thermo-electric cooling. Equipment for refrigerated warehouses, etc.)

"Recent Australian developments in the rapid freezing of meat" prepared by the late Mr. R. R. Sinclair, managing director, J. Wildridge & Sinclair Pty. Ltd.

Second Day

Convention session T2. Chairman : Dr. S. H. Bastow, chief executive officer, C.S.I.R.O.

"Modern methods of food preservation" by Professor R. Plank. (Australia's contribution to overseas meat trade. Thermal properties of meat and fat. Rapid cooling. Artificial atmospheres. Ionizing irradiations, etc.).

"Chilled and frozen beef" by Mr. A. Howard, C.S.I.R.O. Division of Food Preservation, Brisbane.

Convention session C2. Chairman : Mr. K. B. Thompson, vice-president, Refrigeration Service Contractors' Association of N.S.W.

"Service is all-important" by Mr. G. F. Taubeneck.

"Practical ideas for the installation and servicing of refrigeration equipment" by Mr. D. A. Chapman, Kelvinator Australia Ltd., Adelaide.

Annual general meeting. In the presence of Professor R. Plank and Mr. G. F. Taubeneck.

Third Day

Convention session T3. Chairman : Mr. H. J. Stoneman, immediate past-federal president, A.I.R.

"Frozen foods" by Professor R. Plank. (Freezing by immersion in cold brine : (*a*) fish ; (*b*) poultry. Changes taking place during freezing. Does quick-freezing improve the quality of food ? Fish freezing on board ship. New factory ships.)

"Frozen foods in flight" by Mr. R. Edwards, Qantas Empire Airways Ltd.

Ladies' day at the exhibition. Demonstrations of frozen and refrigerated foods preparation. Showground.

Councillors' luncheon.

Convention session C3. Chairman : Mr. E. E. Crouch, superintendent engineer, Dairy Farmers' Milk Co-op. Ltd.

"Air-conditioning and its economics" by Mr. G. F. Taubeneck.

"Air-conditioning in Australia" by Mr. E. W. Colyer, Carrier Air-conditioning Ltd.

128th Council meeting.

Fourth Day

Convention session T4. Symposium on refrigerated transport by road and rail. Leader : Mr. H. V. Langevad, chief engineer, Peters Ice Cream (Victoria) Ltd., Melbourne.

Contributors : Professor R. Plank.
Mr. G. F. Taubeneck.
Mr. R. Pearson, Freightmaster Refrigeration Pty. Ltd., Melbourne.
Mr. H. G. Goldstein, Email Ltd., Sydney.
Mr. E. Benson, Maitland City Council Abattoirs.
Mr. J. G. Frazer, Peters Ice Cream Pty. Ltd., Sydney and others.

Convention session C4. Chairman : Mr. H. G. Goldstein, Federal President, A.I.R.

" Refrigeration in food retailing and self-service " by Mr. G. F. Taubeneck.

" Pre-packaging of fruit and vegetables " by Mr. E. G. Hall, C.S.I.R.O. Division of Food Preservation, Homebush.

Convention dinner. Chairman : The Hon. J. J. Maloney, Minister for Labour and Industry.

Comments : " The Australian Scene " by Professor R. Plank and Mr. G. F. Taubeneck.

Last Day

All-day motor trip to south coast and Sublime Point, visiting the National Park, Bald Hill, the spectacular south coast, Bulli Pass, Sublime Point and other points of interest. The route passed the Atomic Energy Commission's Reactor and Laboratories at Lucas Heights. Lunch at Panorama Hotel at the top of Bulli Pass.

For the benefit of those that were unable to attend the convention, and even those that were present, for it would not be possible to remember all the information and facts given in the lectures, a special " Refrigeration and Air Conditioning Review " will be published, and will cover all convention papers, speaker's illustrations, and discussions following each paper. Copies can be obtained from Refrigeration Press Ltd., London.

THE EXHIBITION

The Hordern Pavilion at the Sydney Showground, probably one of the largest in Australia, was divided into 188 stands, and was just one mass of refrigerating equipment and materials or equipment utilized some way or other in refrigeration or air-conditioning. It can be said, without any fear of contradiction, that never before in the history of Australia have manufacturers combined to display such a wonderful comprehensive array of everything that is required in all sections of the refrigeration industry.

Manufacturers in four States of Australia contributed to the display of equipment.

Previous to the live television programme produced in the pavilion, delegates had the opportunity of viewing what is necessary to be done to a man's face and head before the cameras get to work, for the lady make-up specialist gave us an exhibition in her portable salon whilst " doing-over " George Taubeneck ; when he came out we hardly knew him, he looked so handsome! I understand that he had been so often on radio and T.V. since coming to Australia that he looked forward to having his mouth-muscles massaged.

INTERNATIONAL NEWS

Mexico

Mr. George F. Gilfrin, general manager, Climas Artificiales, S.A., Nazas 31, Apartado 63 Bis, Mexico 5, D.F., has told the British Embassy at Mexico City that his firm would like to get in touch with United Kingdom manufacturers of heat exchangers, automatic controls for air-conditioners and process work, evaporation coolers, washable filters, electronic filters and industrial fans. They are interested in local assembly, manufacture, or importation ; fans are only of interest from the point of view of importing the rotating element and local assembly, all other parts being of local manufacture, preferably in conjunction with or under licence from a United Kingdom firm. Climas Artificiales, S.A., were organized in 1933, to engage in the manufacture of air-conditioning equipment. In control of the company is Mr. George F. Gilfrin, an Englishman. The firm hold a number of exclusive agencies, including several for United Kingdom firms. They have three travelling representatives, five technicians and 10 factory employees. Climas Artificiales, S.A. are considered to be a suitable connexion for United Kingdom firms.

* * *

New York State

Some most informative notes on manufacturing and industrial towns in upper New York State have been prepared by the export services branch of the Board of Trade and may be found useful by British businessmen who have not fully considered this area. There has, perhaps, been a tendency for visitors entering the U.S.A. through New York to suppose that the 8,000,000 people who live in the upper part of the State are dependent on New York City itself and that their needs can be " covered " from Manhattan. This is not always the case and these notes are designed to show that whether the business contemplated is in capital or consumer lines the very independent industrial towns of Upper New York State might repay a visit. The notes cannot be considered comprehensive but should be treated as signposts on the way.

Israel

Alboa Engineering Company Limited, 33, Hahashmal Street, Tel Aviv, have informed the British Embassy at Tel Aviv that they are interested in obtaining the representation in Israel of United Kingdom manufacturers of air-conditioning equipment (particularly for industrial usage) ; refrigeration equipment (large scale) and lifts and elevators The firm is confident that there are at present good opportunities in these lines in the many new factories and building enterprises. They would propose to purchase units, maintain stocks, assemble, supervise and provide full service and maintenance. Alboa Engineering Company Limited were established in March 1958 as a partnership between Messrs. M. Levinson and D. Ben Ezer. Mr. Levinson is the director of Levinson Brothers, Engineers, Limited, a well known and long established firm.

* * *

Australia

Hipsleys Ltd., 27–45, Palmer Street, Sydney, a firm of engineers and merchants, wish to expand their business towards production of a repetitive nature such as domestic appliances, automobile parts and any other forms of production requiring engineering capacity either complete or part, and are interested in establishing a merger with United Kingdom companies for this purpose. Hipsleys Ltd., who were established in 1901, manufacture a comprehensive range of tapping and honing machines and automotive equipment for the engineering and motor trades. They have recently undertaken the manufacture of gear assemblies for washing machines and other equipment. The firm employs about 160 persons and occupies premises with a floor space of approximately 36,000 sq. ft., half of which is used for production and the other half for warehousing and administration. The technical directorship of the firm is under the control of a director who is a graduate in engineering and has both overseas and local experience in mechanical engineering practice. Hipsleys Ltd. are considered to be a suitable connexion for United Kingdom firms.

* * *

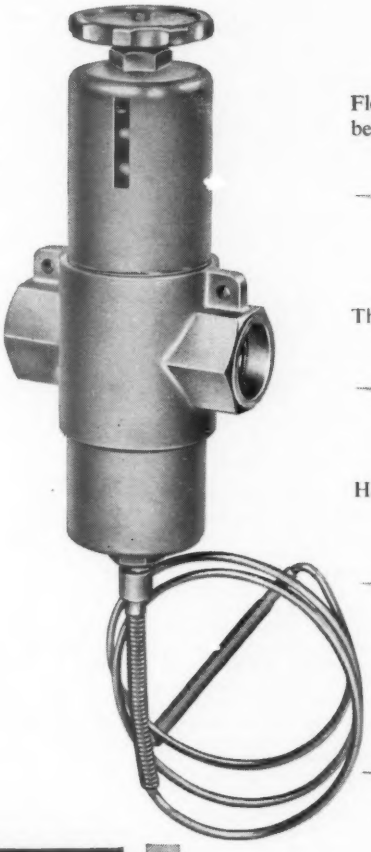
Kuwait

Dashti General Construction Company, P.O. Box 201, Kuwait, have advised the British Political Agency at Kuwait that they are interested in getting in touch with United

ADEQUATE AND CONTROLLED COOLING WATER

assured by the Teddington

G K Water Valve



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TR 51

Kingdom firms in connexion with tenders issued by the Kuwait Development Board and local oil companies. They are particularly interested in electrical projects. Dashti General Construction Company are recently established and act as building contractors to government departments. They are considered to be a suitable connexion for United Kingdom firms. Manufacturers interested in this enquiry should write direct to the Kuwaiti concern. It would be appreciated if, at the same time, they would notify the commercial section, British Political Agency, P.O. Box 300, Kuwait, that they have done so.

* * *

Austria

Messrs. H. Schranzhofer, Vienna XIV, Ameisgasse 63, have informed the British Embassy at Vienna that they would like to get in touch with United Kingdom manufacturers of the following with a view to taking over their representation for Austria : Heat, cold and sound insulation ; highly specialized technical articles, made of rubber, plastics materials and synthetic resin, and asbestos. Messrs H. Schranzhofer, who were founded in the year 1876, engage in the manufacture of insulating material against damp, cold and heat, and trade in these articles and also building materials. About 40 manual workers and 8 to 10 salaried employees are employed by the firm. They are considered to be a suitable connexion for United Kingdom firms.

* * *

U.S.A.

The British consulate-general at San Francisco has advised the Board of Trade that the Hilton Hotels Corporation have completed the acquisition of a $3,000,000 site for the construction of a 1,000-room hotel adjoining the new air terminal building in the centre of San Francisco. The proposed hotel is expected to cost $20,000,000 and consideration is being given to the inclusion of an office building at a further cost of $10,000,000. Preliminary plans are now being developed by Mr. William Tabler, an hotel architect who has designed several Hilton hotels. His office is at 401 Seventh Avenue, New York.

* * *

Canada

The 54th annual Canadian Hardware Show will be held at the Industry Building and East Coliseum in the Canadian National Exhibition Grounds, Toronto, from February 9 to 12, 1959. This event caters for the hardware and houseware industries. At the last event held in 1958, the space utilized for stands was 85,200 sq. ft., and the gross sales area was 180,000 sq. ft. ; 381 manufacturers displayed their wares (19 more than in 1957) and the total number of visitors (trade personnel only) reached 14,412, an increase of 1,221. In 1959 the attendance will again be restricted to the trade. British firms interested in exhibiting at this show should get in touch through their agents with the organizers at the following address : Canadian Retail Hardware Association, 290 Merton Street, Toronto, 7, Ontario.

* * *

The 15th Canadian Restaurant Association's annual convention and exhibition will be held in the Automotive Building, Canadian National Exhibition Grounds, Toronto, from April 6 to 9, 1959. It is designed to include all types of equipment, parts and services related to the food service industry.

* * *

The National Industrial Production Show will be held at the Industry Building, Exhibition Park, Toronto from May 4 to 8, 1959. The Board of Trade, in co-operation with the Birmingham Exchange & Engineering Centre, is organizing a display of British engineering products The Birmingham Exchange and Engineering Centre propose to rent from 3,000 to 5,000 sq. ft. and the Board of Trade official display will, in addition, occupy about 1,000 sq. ft.

* * *

Iran

A recent report on the market for domestic electrical appliances reveals that the most popular size of refrigerator (probably about 70 per cent of the market) is 8 cu. ft. This should suit United Kingdom manufacturers, but they are faced by stiff competition from the United States. There is however a tendency among local importers to overestimate the U.S. lead. General opinion is that the United States share of the market is about 80 per cent. whereas the import statistics show that 60 to 70 per cent. is perhaps a truer estimate.

* * *

Iraq

A valuable report on refrigerators and refrigeration plant in Iraq has been prepared by the Board of Trade. It states, *inter alia*, that in the years immediately after the war, the United Kingdom dominated the Iraq market for domestic refrigerators amd freezing plants. During the 1950s American suppliers have taken an enormous lead in the sale of domestic refrigerators, and in the most recent years Dutch, German, American and French manufacturers of refrigerating plant have increased their hold upon the market. In both industrial and domestic fields, it is true to say that exports from the United Kingdom have, with some fluctuations, increased. But Iraq's total imports have risen so steeply since 1952 that the United Kingdom proportion of the market has fallen in the case of domestic refrigerators from 55 per cent. to less than 20 per cent. and in the case of industrial freezing plant from virtual domination of the market to about 20 per cent. In a market which is continuing to expand and is likely to do so for many years as oil revenues are diffused more and more widely among the community there is scope for a very great expansion in imports from the United Kingdom.

OBITUARY

MR. G. A. S. HARVEY

We regret to have to announce that Mr. George Alfred Sydney Harvey, president of G. A. Harvey & Co. (London) Ltd., passed away last month. Born in 1884, he was educated at Mill Hill ; on leaving school at the age of 17 years he entered his father's business at Lewisham and West Greenwich. His early training with G. A. Harvey & Co. well fitted him with the more responsible duties that he so ably carried out in subsequent years. He was appointed assistant managing director on the incorporation of the company in 1913 when the works were moved to its present site in Woolwich Road. Very soon after this move Mr. Harvey accepted the position of managing director. On the death of his father in 1937 he was appointed chairman and managing director, a post he occupied until his retirement from active participation in the company's business in 1956 when he was appointed president. The immense growth of the firm's industrial activities from 1913 onwards, to its financial stability and the high reputation of its products, are visual proofs of his wise counsel and leadership. He will long be remembered by the members of his staff and works for his continual consideration for their welfare and for the creation of an atmosphere of efficiency and service which is the character of Harvey's and which has never changed.

IIR NEWS

with particular reference to the Bulletin of the International Institute of Refrigeration. No. 2, Vol. 38, 1958

By DR. EZER GRIFFITHS, O.B.E., F.R.S., President of the General Conference, I.I.R.

IN the autumn of this year several of the commissions will have their annual meetings. It is interesting to note that commission 6 will meet at Karlsruhe in the second half of October to discuss " application of refrigeration in chemical processes particularly in the low temperature range." As a supplement to the meeting a visit will be made to the factories of the Badische Anilin-und Sodafabrik in Ludwigshafen. Those who wish to attend should apply to Prof. Nesselmann, Karlsruhe, Kaiserstrasse 12.

An international freeze-drying course is to be held at Lyons, August 25 to September 5.

The *Bulletin* contains the programme of work of the Division of Applied Biology, Canada. Some of the topics being studied are :—Refrigerated rail transport, peach precooling, poultry freezing, frozen storage of milk and freezing of biological materials.

The Centro Experimental Del. Frio, Madrid, has completed various researches on storage of potatoes, oranges, milk, beef and fish.

Amongst items proposed for further work by this centre are : Experiments on the behaviour of some metals at low and very low temperatures, cooling of citrus fruits, lettuce, grapes. It is also studying the standardization of refrigerating machines and equipment in Spain and the deodorization of cold rooms.

In France, the Experimental Station of Refrigeration at Bellevue has carried out studies of the storage and ripening of pears, wrapping of apples, changes in ascorbic acid content of blackberries.

The Institute for Research on Storage and Processing of Horticultural Produce, Wageningen, is making a study of apples and pears under various conditions of storage. The list of the items of work takes up seven pages of the *Bulletin*.

In the heat transmission section, a brief abstract is given of a paper in *Transactions New York Academy of Science*, 1957 relating to analogue circuits applied to stationary conditions in exchangers with two refrigerants as well as the transient state for three refrigerants with parallel flow.

There is also an abstract of a German paper on electrical analogues of non-stationary phenomena in heat exchangers.

An abstract of a paper in *Refrigerating Engineering* September 1957 deals with rates of thermal decomposition of refrigerants-22 and -12.

Molecular sieves for selective absorption is the subject of a paper emanating from the Linde Air Products Company.

Simple moisture indicating device for refrigerating systems relates to colour indicators using cobalt salts.

The section of the *Bulletin* relating to mechanical compression equipment has a number of interesting abstracts, such as " Booster system helps meat packer cut expansion costs " ; " Oil separators for automatic refrigerating plants " ; " Design of wire and tube condensers."

There is an abstract of a paper on protection against rust in refrigerating plants. A paper published in *Refrigeration*, Japan, gives performance tests of household absorption refrigerators ; the results were compared with those obtained on compression refrigerators.

Abstracts contain information on new cold stores at Cremona which boasts 38 rooms and one at Nantes. An old ice-making plant at Southampton has been converted into a highly mechanized sub zero store.

There are a number of abstracts relating to air-conditioning; one deals with the filtration of air in industrial air-conditioning equipment.

The Spanish *Revista del Frio* has an article on the use of antibiotics in ice making and fish preservation, the subject is considered on a biochemical basis and a comparison made of results obtained with different techniques.

In the U.S.A. an industry standard rating method has been worked out for mechanically refrigerated truck trailers. Field tests results are compared with the static rating obtained in a test room.

The *Bulletin* contains numerous abstracts of papers relating to pure science, for example " The thermal and electrical resistivity of tellurium at low temperatures."

There is an abstract of a paper with the title " Artificial rain : The problem of earning capacity."

Building and civil engineering projects are covered. One abstract has the title " application of refrigeration to civil work."

As usual in the *Bulletin*, many abstracts are devoted to fruit. One in a series of abstracts which have already appeared deals with the time/temperature tolerance of frozen foods, in this case, strawberries, raspberries and peaches.

Under the heading of vegetables we find abstracts of papers relating to potato storage, onions, peas and lettuce.

The pigment changes in packaged beef during storage are receiving study in the U.S.A.

The literature on milk is well covered by the abstract, so is ice cream.

The *Bulletin* concludes with a list of associate members of the Institute complete up to 3rd March, 1958.

* * *

Bulletin No. 3 Vol. 38, 1958

This issue of the *Bulletin* contains the draft technical programme of the Tenth International Congress of Refrigeration to be held in Copenhagen, Denmark, from August 19 to 26, 1959.

Three subjects will be considered in plenary sessions : (1) Refrigeration as applied to human beings ; (2) Refrigeration during transportation ; (3) Trends in the development of refrigeration machinery.

The topics to be considered by commissions and joint sessions take up two pages of the *Bulletin* to enumerate. They include some very interesting topics ranging over the entire field of refrigeration. Rules are given for submission of papers and the conduct of meetings.

The *Bulletin* lists some of the forthcoming meetings and congresses such as the 4th International Congress of Biochemistry, World Meteorological Organization, 16th Veterinary Congress, 11th World's Poultry Science Congress, Symposium on Solar Heating, 5th Congress of Rural Engineering, 4th Convention on Nutrition and Vital Substances, General Fisheries Council for the Mediterranean.

A feature of the *Bulletin* is the information given as to research work in progress in laboratories throughout the world.

The list of items by the Agricultural Marketing Service, U.S. Dept. of Agriculture, runs to 9 pages of the *Bulletin*.

Reviewing some of the abstracts which number 177, there is a long one on " Refrigeration in the grape juice industry " As " grape must " is an extremely unstable product, refrigeration is applied in the several processes for stabilization.

In the section of the *Bulletin* covering cooked dishes, we find an abstract entitled " Problems in the manufacture of fish sticks " : a product which has met with an amazing

success in the U.S.A. " Automatic quick-freezing of fish sticks " describes the procedure for bringing the sticks from the fryer temperature of 400° F to a solid frozen state at 0° F. in less than an hour.

Problems relating to the rapid production of ice for the fishing industry are discussed in a paper published in *Revista Argentina del Frio.*

Three abstracts relate to rail transport. A Danish author gives information as to the low transport speed prevailing and suggests means to reduce transport time. An American paper describes the new car just completed by the Pacific Car and Foundry Company. The car has an effective capacity of 50 t. and is 12 m. in length.

The third abstract relates to the transit refrigeration of mature-green tomatoes from the lower Rio Grande valley of Texas. The programme preferred is to have vans with fans running, and vents closed, receiving heavy initial icing and limited re-icing.

Air-conditioning installations and heat pumps are topics to which several abstracts are devoted : one relates to factory-made packaged units for space cooling made in capacities up to 70 tons of refrigeration with " Freon-12 " as the refrigerant. Another abstract describes experiments using solar energy for operating refrigeration apparatus.

Dealing with refrigeration as regards industrial products and techniques there is a lengthy abstract of a paper on " The removal of salt from water by freezing " which discusses the technique for the removal of much of the residual salt.

Freeze-drying of food products is the subject of a 63 page article on advances in food research. Other abstracts under the heading " Fruit " include a survey of the marketing of frozen foodstuffs in Western Germany : experiments on the freezing of strawberries from a Norwegian journal : studies on gas storage of persimmons from Japan.

Three abstracts relate to storage of potatoes. Dairy products are the subject of several abstracts; one from the U.S.A. is entitled " Development of flavours in sterile milk by pure cultures of bacteria at low temperatures," another " Bacteriology of milk held at farm bulk cooling tank temperatures " and a third " Cooling in the dairy industry " from Norway.

The abstracts relating to economics and statistics include one of a paper by M. Thevenot on " The refrigerating equipment in agriculture and food domains of various countries of the world."

Book reviews include publications entitled Problems concerning the cold storage of apples ; Refrigeration handbook ; Fundamentals of cheese-making technics ; Technical handbook for control devices; and an O.E.E.C. report on applications of atomic sciences in agriculture and in the food industry.

The I.I.F. has undertaken the task of compiling a multi-lingual dictionary in the field of refrigeration and invites comments from readers on the provisional list of expressions selected.

In conclusion, the *Bulletin* supplies a list of transliteration of Russian characters into Latin characters taken from I.S.O.R9. (International Organization for Standardization).

Modern Refrigeration is obtainable from the manager, Maclaren House, 131, Great Suffolk Street, London, S.E.1, at thirty-five shillings per annum, post free to any part of the world.

New Companies

The accompanying particulars of New Companies recently registered are taken from the Daily Register compiled by Messrs. Jordan and Sons Ltd.

Harrison-Page (Refrigeration) Ltd., 63, Lion Road, Bexleyheath. Secretary : Barbara P. Harris. To take over business of refrigeration engineers carried on at 2, St. John's Road, Sidcup, by E. E. Harris. Nominal capital : £3,000. Directors : Edmund E. Harris and Mrs. Kathleen Harris, 2, St. John's Road, Sidcup. Registered by Shaw & Sons Ltd.

J. A. Halpin & Sons Ltd., 34, Carlton Crescent, Southampton. Secretary : Celia D. Halpin. To take over business of radio, television, refrigeration, electronic and electrical engineers and dealers in, and retailers of, radio, television, electrical appliances and component parts carried on at Southampton by J. A. Halpin, etc. Nominal capital : £3,000. Permanent directors : Joseph A. Halpin and Mrs. Celia D. Halpin, The Sheiling, 27, Spencer Road, New Milton, Hants. Registered by Jordan & Sons Ltd.

Mercantile Refrigeration Ltd., 72, Leadenhall Street, E.C.3. Secretary : J. J. Horgan. Nominal capital : £100. Director : Wm. S. Prince, 72, Leadenhall Street, E.C.3. Registered by solicitors : Tringhams, W.1.

Holliday (Heating) Ltd. To carry on business of heating, cooling, ventilating and general engineers, etc. Nominal capital : £1,000. Directors : Harold A. Holliday, Northoaks, High Trees Road, Reigate ; Michael J. Holliday, address not stated. Subscriber : Kathleen Holliday, Northoaks, High Trees Road, Reigate. Registered by solicitors : Bulcraig & Davis, Amberley House, Norfolk Street, W.C.2.

Bonham Electrical Co. Ltd., Sibthorpe Street, North Shields, Northumberland. To carry on business of electrical engineers, general electrical and refrigeration installation contractors, etc. Nominal capital : £15,000. Directors : James Sharp, 37, Vespasian Avenue, South Shields, Co. Durham ; Dennis G. Dobson, 35, Allendale Drive, South Shields, Co. Durham. Solicitors : Patterson, Glenton & Stracey, South Shields. Registered by Solicitors' Law Stationery Society Ltd.

Reamac Ltd., 59, Linkfield Lane, Redhill, Surrey. To carry on business of dealers in refrigerators, etc. Nominal capital : £1,000. Permanent directors : Robert E. A. McCulloch and Eileen M. McCulloch, 59, Linkfield Lane, Redhill, Surrey. Registered by S. McCombie & Son, Stevenage.

Shales & Co. (London) Ltd., 110, Devonshire Road, Chiswick, W.4. To carry on business of ice cream and sweet manufacturers ; cold storage and depository proprietors, caterers, etc. Nominal capital : £1,000. Director : to be appointed by subscribers. Subscribers : Wm. R. Clarke, 24, Landseer Road, New Malden, Surrey (clerk) ; Royston Swallow, 6, New Square, Lincoln's Inn, W.C.2 (clerk). Registered by solicitors : Edgley, Harding & Philips, W.C.2.

Syvent (London) Ltd. To carry on business of heating, ventilating, air-conditioning and fire protection experts and advisers, etc. Capital : £100. Directors : J. W. Reed, 13, Great James Street, Bedford Row, W.C.1 ; J. Organ, 23 Montagu Street, W.1 (co. dir).

Linde Refrigeration and Machinery Ltd. Capital : £10,000. Directors : to be appointed by subscribers. Subscribers : Eric Wolff & Stephen A. Fenlaugh (Solicitors), 20, Copthall Avenue, E.C.

Northern Cold Storage Ltd. Capital : £50,000. Directors : Charles G. Porter, 130 Pavilion Road, S.W.1. ; Wm. J. A. Fearn, 3B, The Market Place, N.W.11 ; Tore Lauritgson, Franz Malmros, Carl S. Roos and Sigvard Wilsson, all of Sweden.

REFRIGERATION PATENTS

These new refrigerating patents have been specially selected for readers by MODERN REFRIGERATION from the Official *Journal of Patents*, and are published by permission of the Controller of H.M. Stationery Office.

APPLICATIONS RECEIVED

June 3—Regulator Akt.-Ges., C17628, Temperature maintaining method. 4—Barber, R. J. P., P17795, Domestic freezers ; Veb Maschinenfabrik Nema. Ernst.S., C17836, Gas refrigeration machine. 5—General Motors Corporation, C17991, Freezer tray-grid assembly. 9—Donner, H. O., C18377, Cooling devices ; Wahnoe, H., P18294, Food cabinets cooling system. 12—Arnott, D. D., P18767, Refrigerators ; Barsey, L., and Ashcroft, J. P., P18833, Liquids cooling means. 17—Armstrong Cork Co., C19319, Sound absorbing material making apparatus. 19—General Motors Corporation, C19609, Refrigerators, C19612, Refrigerator cabinet ; Kelvinator Ltd., Ham D. J. A., P19636, Refrigerating apparatus. 20—Normalair Ltd., Fishburn, W., and Kiddie, D. J., P19759, Vehicles air conditioning systems. 25—Ges.fur Linde's Eismaschinen Akt.-Ges. C20422, Refrigeration apparatus ; Munters & Co., C., C20342, Air conditioning exchangers ; Pressed Steel Co., Ltd., Nünn, G. W., P20329, Refrigerator cabinets ; Pressed Steel Co., Ltd., Tarrell, K., P20330, Refrigeration defrosting system ; United Aircraft Corporation, C20344, Aircraft air-conditioning system. 27—Electrolux Ltd., C20667, Refrigerator cabinets. July 2—Fichtel & Sachs Akt.-Ges., C21225, Refrigerating installations ; Mann Egerton & Co., Ltd., Edmonds, R. A., P21248, Cold storage chambers.

COMPLETE SPECIFICATIONS ACCEPTED

June 18—General Motors Corporation, 799,557, Air Conditioner installations for rail coaches. 25—Hoyer, O. G., 800,105, Filling machine for ice cream freezing machines ; Kraepelin, E. O., 800,053, Freezing tray ; Carrier Engineering Co., Ltd., 800,088, Refrigeration systems ; 800,249, Absorption refrigeration ; York Shipley Ltd. (York Corporation of York), 800,246, Heat pump systems. July 2—Carrier Engineering Co., Ltd., 800,310, Absorption refrigeration ; Whirlpool Corporation, formerly Whirlpool-Seeger Corporation, 800,567, Refrigerant systems. 9—Dairy Supply Co., Ltd., 800,944, Milk tanks. 16—General Electric Co., Ltd., 801,171, Method of manufacturing cylinder heads for refrigerant-compressors ; Compagnie Francaise Thomson-Houston, 801,378, Refrigerator ice trays.

MOLECULAR SIEVES FOR THE DRYING OF REFRIGERANTS

THE "Union Carbide"* laboratories have conducted several testing programmes to evaluate molecular sieves for drying refrigerants. Several drier and refrigeration manufacturers have also done extensive testing of molecular sieves. The test results indicate that these materials meet the standard requirements for refrigerant desiccants besides having certain outstanding advantages.

What are the requirements that a refrigerant desiccant should meet ?

A refrigerant desiccant should have a high water capacity at low water concentrations and at moderate temperatures (75° to 140° F.—24 to 60° C.) ; its capacity should be unaffected by oil which may be dissolved in the refrigerant.

Molecular sieves have much higher water capacities when drying refrigerants, even when the refrigerants contain oil, than any of the standard desiccants. The best place to evaluate molecular sieves capacity advantages is at the 10 ppm concentration since this guarantees maximum protection for the refrigeration system.

A refrigerant desiccant should remove acids.

Corrosion and sludge formation have been a problem in refrigeration systems. It was thought that the acids which cause these troubles formed when the water concentration reached 300 ppm. Recent research, however, indicates that acids can form when the water concentration is only 15 to 25 ppm. Molecular sieves will keep the water concentration below this danger level, it is claimed.

It is important to remember that it is considered poor practice in the refrigerant trade to rely on desiccants to remove acids. High acid concentration is the result of a defective refrigeration system. The desiccant should not be expected to solve the problem.

A refrigerant desiccant should not corrode aluminium, brass, steel, etc.

Tests run by Union Carbide laboratories gave no indication that molecular sieves would cause corrosion of any of the metals used in refrigeration systems.

A refrigerant desiccant should show negligible attrition in the liquid refrigerant.

A refrigerant desiccant should not break down in the presence of the refrigerant, oil or water.

*Trade mark of Union Carbide Corporation.

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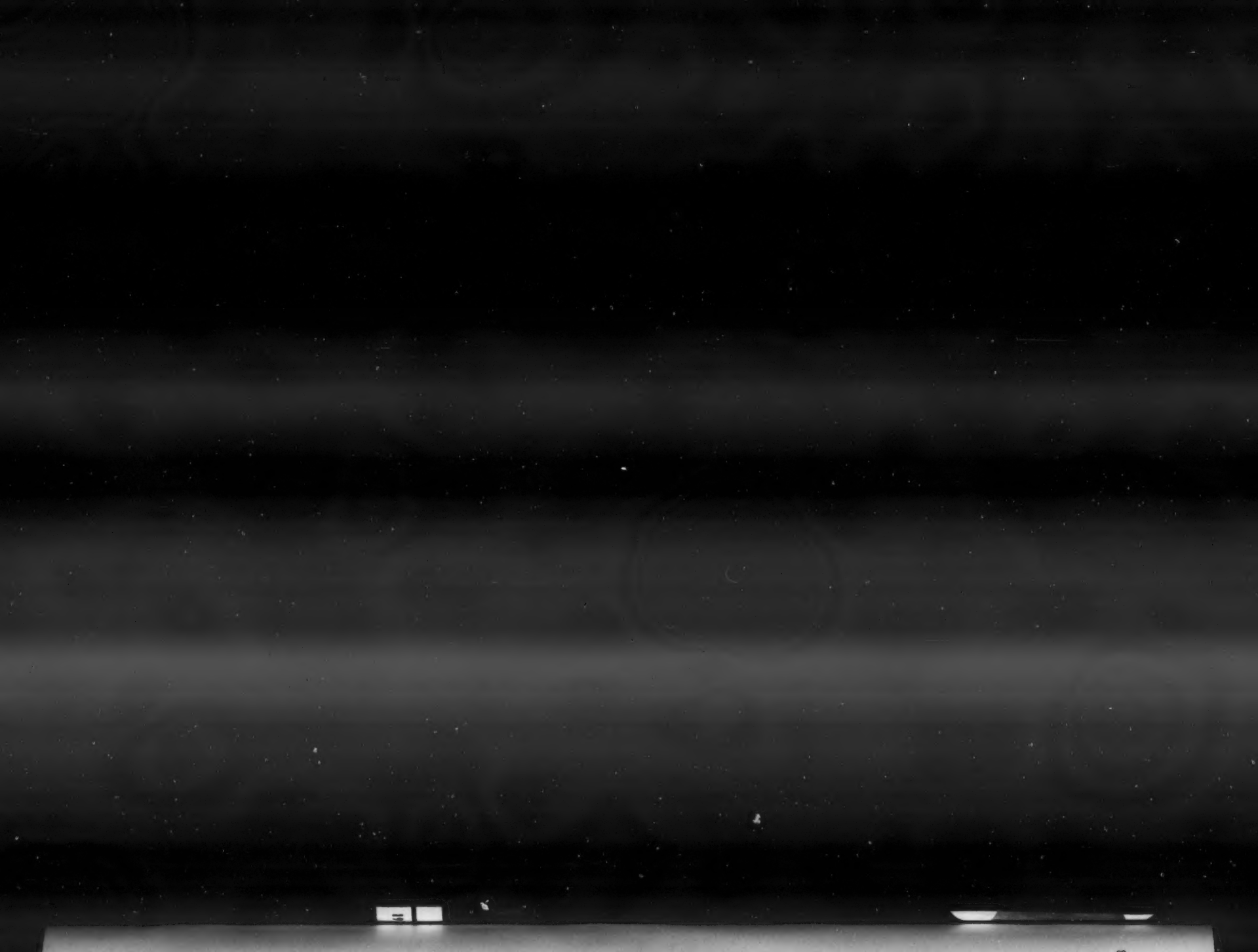
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